Devoted to
TEXTILE
CHEMISTRY
BLEACHING
DYEING
PRINTING
FINISHING

APRIL 13, 1942
VOLUME 31, No. 8

AMERICAN
DYESTUFF REPORTER

TECHNOLOGY DEPT.

PUBLIC LIBRARY
APR 20 1942
DETROIT

How will you dye new combinations and weaves?

You and other textile processors have already started to do something about conservation. Of course, you want to use every fiber and every ounce of dye to best advantage. Naturally, you are substituting where fibers essential to war effort are restricted. And you are developing new combinations and weaves for civilian uses.

But where do all these results of conservation leave you on the next problem? There's still the question of dyeing before you can produce finished fabrics of the best possible quality.

The answer, as we see it and as some processors have already discovered, lies in the closest and most thorough cooperation with the dyestuffs manufacturer. He has a problem too. He has to conserve and use to best advantage every ounce of dye and chemical.

Du Pont dyestuffs technicians are alive to the need for conservation and to the changes in fibers and fabrics. They will help, wherever possible, any textile processor who seeks their aid in revising old dyeing and finishing formulas and establishing new ones for today's available raw materials. You will hear more on this subject in future months. E. I. du Pont de Nemours & Company, Inc., Organic Chemicals Dept., Dyestuffs Division, Wilmington, Delaware.

DU PONT DYESTUFFS

OFFICIAL PUBLICATION
of the
PROCEEDINGS
AMERICAN ASSOCIATION
OF TEXTILE CHEMISTS
AND COLORISTS

DECERESOL* WETTING AGENTS

SPEED UP PROCESSING STEPS

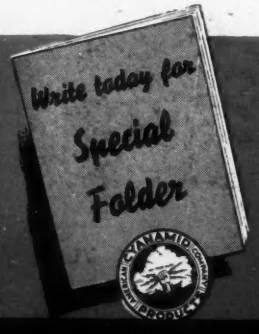
The steps you take in processing your fabrics can be made easier and faster with DECERESOL Wetting Agents.

Experience in mills of all types proves that the DECERESOLS increase efficiency in scores of wetting, dispersing and emulsifying operations. Even though you may believe your methods are as efficient as they possibly can be, it is likely that one or several of the DECERESOL Wetting Agents will help you get better results at lower cost or in less time.

Here are a few of the ways in which DECERESOL Wetting Agents are proving their value to users:

Wetting out grey cotton piece goods
In mixing liquid soaps with strong detergency
Rewetting to increase absorbency on sanforizer
Adding to dyebath to increase penetration
Preparing raw cotton stock for dyeing
As a dispersing agent in dissolving dyestuffs
De-oiling or de-gumming raw cotton stock
In treatment of water prior to addition of dry starch
In "brown souring" for better penetration
In the oxidation of vat prints
The desizing of rayon or acetate piece goods

*Reg. U. S. Pat. Off.



American Cyanamid

& CHEMICAL CORPORATION

A Unit of American Cyanamid Company

30 ROCKEFELLER PLAZA, NEW YORK, N. Y.

DISTRICT OFFICES: Boston, Mass.; Philadelphia, Pa.; Baltimore, Maryland; Charlotte, N. C.; Cleveland, Ohio; Chicago, Ill.; Kalamazoo, Michigan; Detroit, Michigan; St. Louis, Missouri; Azusa, Calif.

EXPERIENCE PROVES THAT

NATIONAL and KARBATE*

TRADE-MARK TRADE-MARK

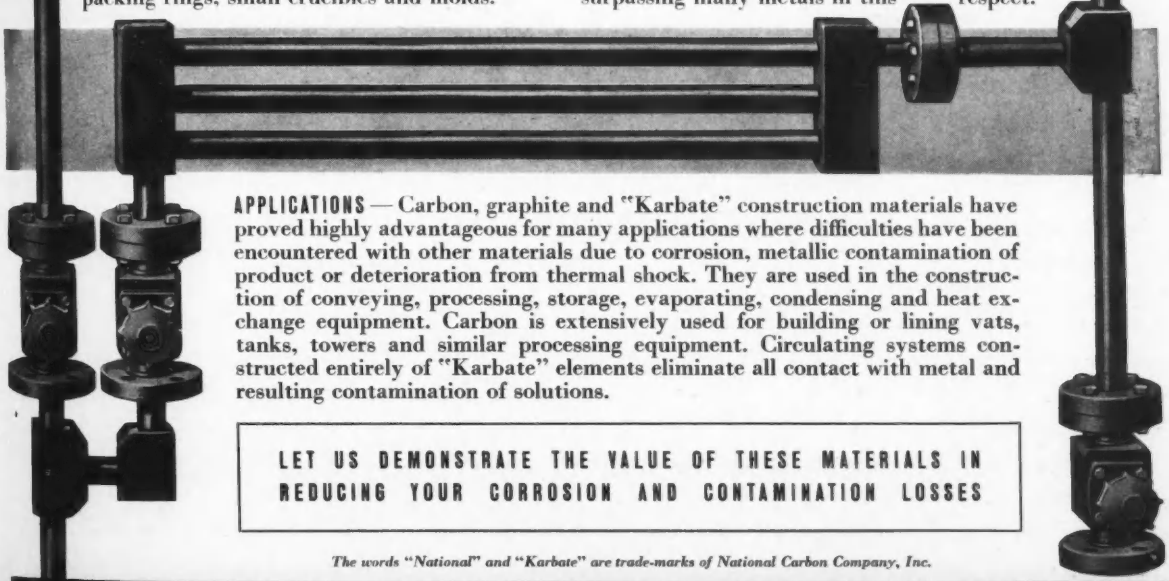
Carbon and Graphite Products

CAN BE USED EFFECTIVELY TO ELIMINATE LOSSES FROM CORROSION AND METALLIC CONTAMINATION OF PRODUCT

* "Karbate" products are manufactured from carbon or graphite made impervious to seepage of fluids under pressure.

PRODUCTS—"National" and "Karbate" carbon and graphite products are available in many forms which can be used to advantage by the Textile Industries. These include pipe, tubes, valves and fittings; brick, slabs, blocks, beams, cylinders and other structural shapes; also a great variety of specially machined or molded products such as carbon rolls, graphite bearings, packing rings, small crucibles and molds.

PROPERTIES—Carbon, graphite and "Karbate" products are highly resistant to reaction with most acids, alkalies and other corrosive, solvent or reducing agents. They possess good mechanical strength, are highly resistant to thermal shock, and are readily machined. Graphite and graphite-base "Karbate" products have the further advantage of high thermal conductivity, surpassing many metals in this respect.



APPLICATIONS—Carbon, graphite and "Karbate" construction materials have proved highly advantageous for many applications where difficulties have been encountered with other materials due to corrosion, metallic contamination of product or deterioration from thermal shock. They are used in the construction of conveying, processing, storage, evaporating, condensing and heat exchange equipment. Carbon is extensively used for building or lining vats, tanks, towers and similar processing equipment. Circulating systems constructed entirely of "Karbate" elements eliminate all contact with metal and resulting contamination of solutions.

LET US DEMONSTRATE THE VALUE OF THESE MATERIALS IN REDUCING YOUR CORROSION AND CONTAMINATION LOSSES

The words "National" and "Karbate" are trade-marks of National Carbon Company, Inc.

NATIONAL CARBON COMPANY, INC.
Unit of Union Carbide and Carbon Corporation
UCC

Carbon Sales Division, Cleveland, Ohio
GENERAL OFFICES
30 East 42nd Street, New York, N. Y.
BRANCH SALES OFFICES
New York, Pittsburgh, Chicago, St. Louis, San Francisco

American Dyestuff Reporter, Vol. 31, No. 8. April 13, 1942. Published every other Monday. Copyright, 1942, by Howes Publishing Co., 440 4th Ave., New York, N. Y. Domestic subscription, $5.00; Canadian, $6.00; Foreign, $6.00. Entered as second-class matter, Nov. 6, 1919, at the New York, N. Y., Post Office, under the act of March 3, 1879.

what have starches and gums
to do with
winning this war?
PLANES AND TANKS ARE NO STRONGER THAN THE FIGHTING METTLE OF THE MEN WHO CONTROL THEM. BUT THEIR CREWS REQUIRE MORE THAN MECHANIZED EQUIPMENT. THEY MUST HAVE DURABLE CLOTHING. THAT'S WHERE STARCHES AND GUMS COME IN.
Army textiles made far behind the battlefronts must have that high quality which Uncle Sam's fighting forces deserve. That's why Stein-Hall . . as never before in its 76 years of uninterrupted history . . is keyed to the production of the highest quality special starches and gums it is possible to devise for textile sizing, finishing and printing. Our technical facilities are at your service . . for the duration and afterward.

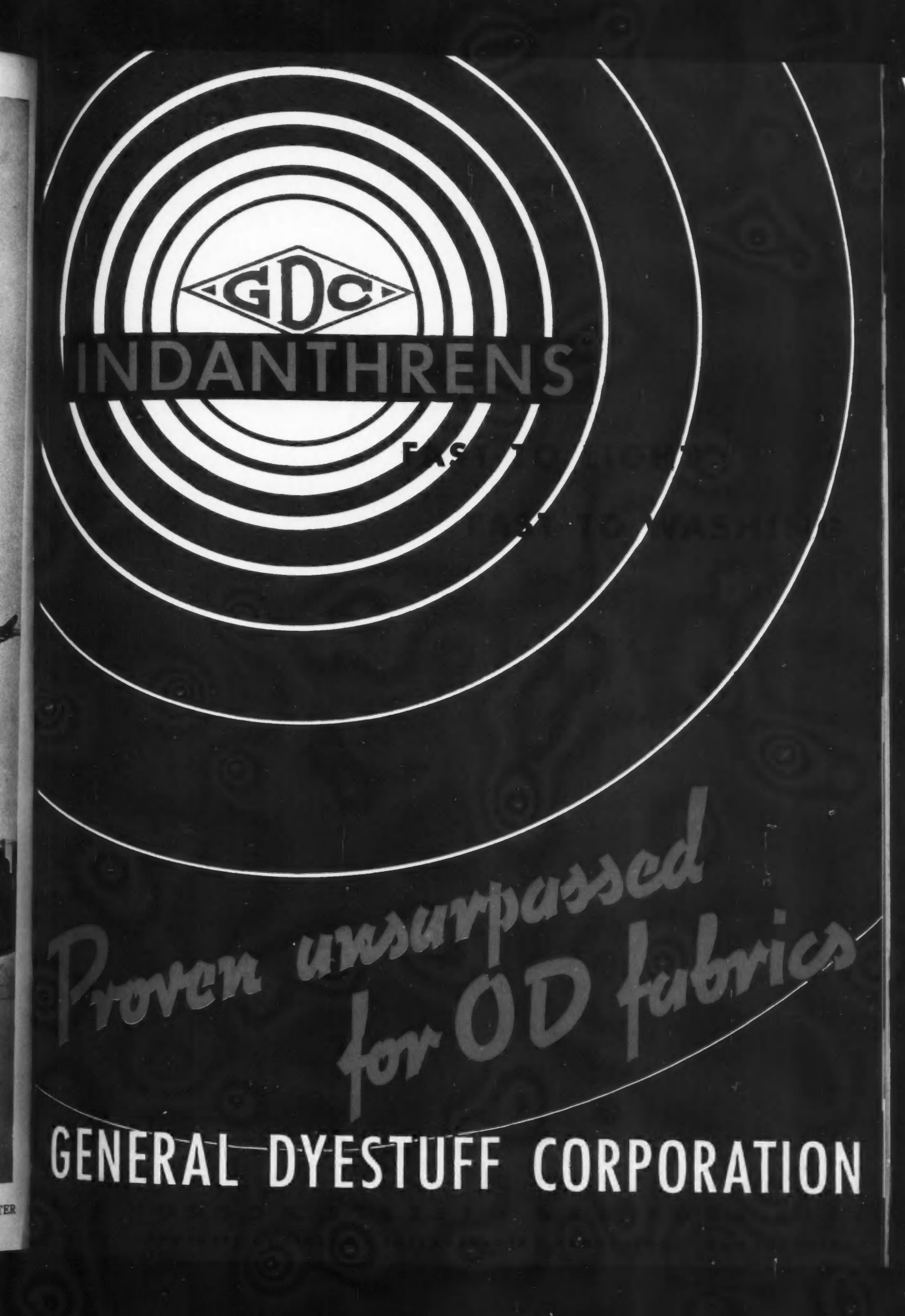
SEVENTY-SIX YEARS OF STARCH SERVICE

STEIN, HALL & COMPANY, Inc.

285 Madison Avenue • New York 1011 Johnston Bldg. • Charlotte, N. C.

LABORATORIES AT . . NEW YORK • CHICAGO • CHARLOTTE • PROVIDENCE • LONG ISLAND CITY N. Y.

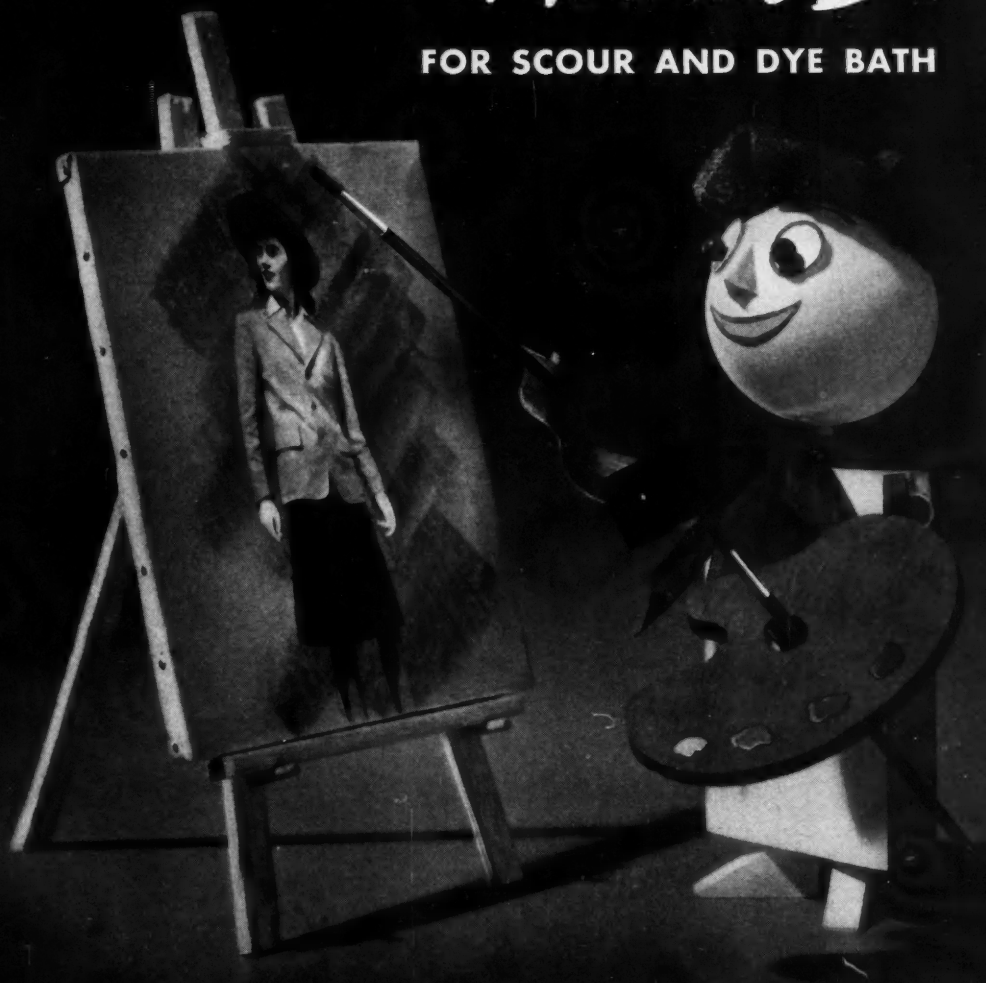
A TEXTILE STARCH FOR EVERY TEXTILE PURPOSE


GDC
INDANTHRENS
Proven unsurpassed for OD fabrics
GENERAL DYESTUFF CORPORATION

A SUPERIOR SPUN RAYON JOB

WHEN YOU USE *Modinal* D*

FOR SCOUR AND DYE BATH



SPUN RAYONS are adding daily to their diversified uses. Many new weaves, particularly suitings and heavy cloths, require the most exacting finishing standards.

"Modinal" D extra-strength detergent is now used to advantage in many mills in both scouring and dyeing.

Spun rayons are left with a softer, loftier, more wool-like hand. Dye penetration is improved—results are more uniform. And no fatty odor mars the finished appeal.

Have one of our technical men call at your plant to discuss where and how "Modinal" D improves finishing operations and results.

* **"MODINAL"** *is the trade-mark used by the Gardinol Corporation to designate a group of its fatty alcohol sulphates.*

GARDINOL CORPORATION, GENERAL OFFICES, WILMINGTON, DEL.

SALES AGENTS: Procter & Gamble, Cincinnati, Ohio · E. I. du Pont de Nemours & Co. (Inc.), Wilmington, Delaware

Life Insurance for Lumber

THE ZMA PROCESS

(T. M. Reg. U. S. Pat. Off.)

Long used and proven method of protecting wood from attack by termites and rot fungi is the ZMA Process—developed by our affiliated company, the Curtin-Howe Corporation.

Employing zinc meta-arsenite, introduced by vacuum impregnation at licensed wood-treating plants, the ZMA Process gives economical, effective and long-lasting protection.

Wood preserving is but one of many fields in which Westvaco Chemicals have helped to produce better results at lower costs.

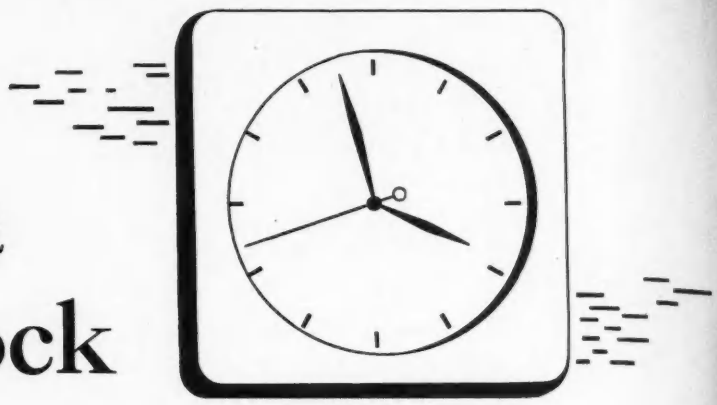
WARNER CHEMICAL COMPANY

Division of WESTVACO CHLORINE PRODUCTS CORPORATION

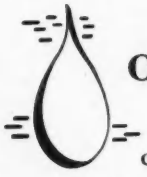
CHRYSLER BUILDING, NEW YORK, N. Y.

CHICAGO, ILL. · GREENVILLE, S. C. · NEWARK, CAL.

This is a Clock



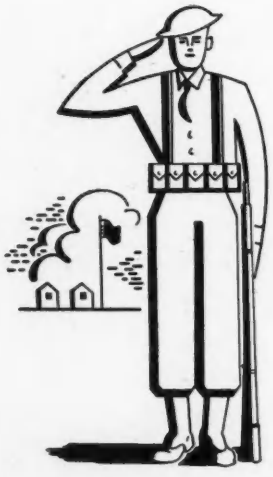
That relentlessly ticks off the seconds—minutes—hours —that mean *speed, speed, speed* in America's war effort.

This is a drop  of Yarmor* 302-W Pine Oil

That is making each second count in key textile processing operations. It is cutting fulling time as much as 30%, besides doing an efficient job in kier boiling and as a dye assistant.

This is a Hercules Chemist

Who is backing up America's war effort by developing new, improved chemical materials—who, besides developing Yarmor 302-W, has just succeeded in producing synthetic pine oil, to help produce many more yards of cloth, many more minutes faster than ever before.



And this is the Soldier

Representing our rapidly growing armed forces—who is a living tribute to the textile industry in making him the best and most comfortably dressed soldier in the world—all in record time.

NAVAL STORES DEPARTMENT

HERCULES POWDER COMPANY

Incorporated

993 MARKET STREET • WILMINGTON • DELAWARE

Branch Offices: Chicago • New York • St. Louis • Salt Lake City • San Francisco

*Reg. U.S. Pat. Off., by Hercules Powder Company

What the Best-Dressed Man Will Wear
GLASS WOOL and SPUN RAYON
What a mixture to confound the old-time rule-of-thumb dyer! Now wrinkle-proof ties are being woven from spun-dyed glass wool faced with yarn-dyed rayon. Customers are completely pleased with the results!
Paralleling these ceaseless developments of new textile fibers and new processing techniques, National Technical Service works constantly to develop the formulas and colors you will need tomorrow as well as to provide for your present production needs.
Refer your technical problems to nearby National Technical Service.

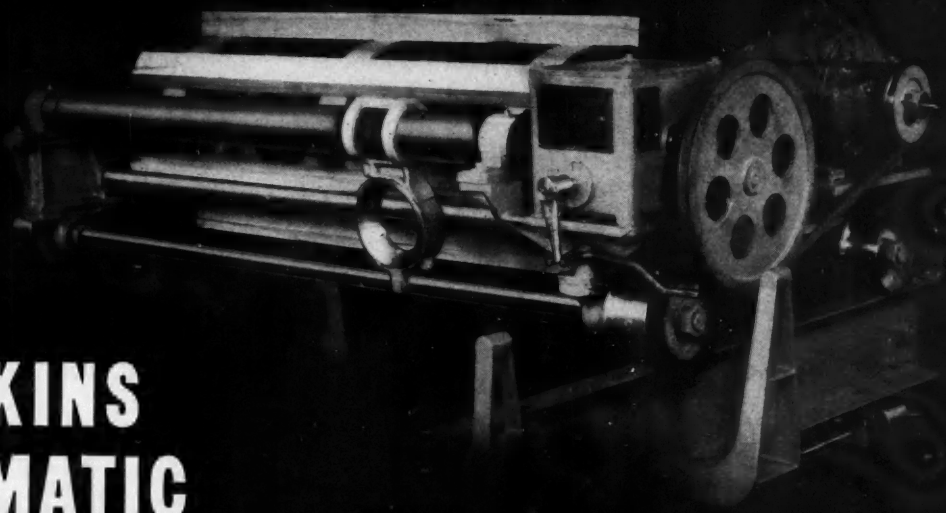
NATIONAL ANILINE DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 RECTOR STREET **NEW YORK, N. Y.**

BOSTON	150 Causeway St.	SAN FRANCISCO	517 Howard St.	NEW ORLEANS	Masonic Temple Bldg.
PROVIDENCE	15 Westminster St.	CHARLOTTE	201-203 W. First St.	CHATTANOOGA	James Bldg.
CHICAGO	357 W. Erie St.	GREENSBORO	Jefferson Standard Bldg.	PORTLAND, ORE.	730 West Burnside
PHILADELPHIA	200-204 S. Front St.	ATLANTA	140 Peachtree St.	TORONTO	137-145 Wellington St., W.

BRANCHES AND DISTRIBUTORS THROUGHOUT THE WORLD



PERKINS AUTOMATIC BIN PILERS

PATENTED

You cannot afford to pile by hand

B. F. PERKINS & SON, Inc.

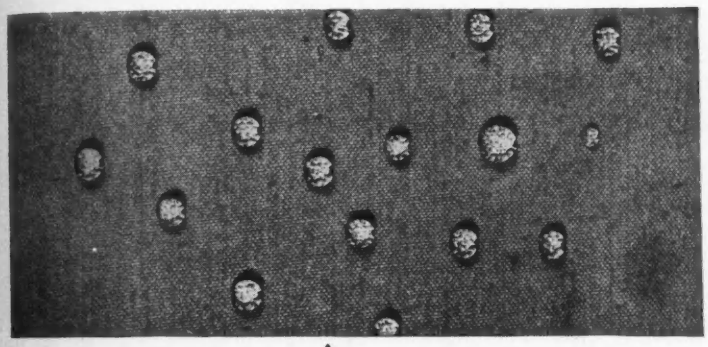
ENGINEERS AND MANUFACTURERS

HOLYOKE, MASS.

IMPORTANT FACTS ON MOISTUREPROOFING

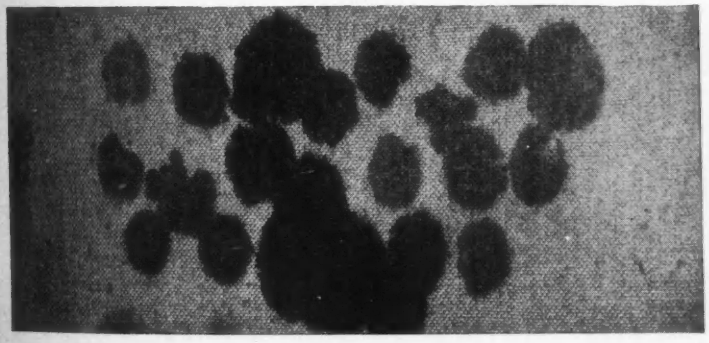
No Special Equipment or Solvents Needed with S/V Fabrisec M. P.

UNRETOUCHED TEST PHOTOGRAPHS



Above is a sample of canvas treated with S/V Fabrisec M. P. Water sprinkled on it remained in drops until it evaporated.

Below is another sample of canvas which was left untreated. Relatively quick wetting action is shown by dark spots.



MOISTUREPROOFING — AND MILDEW-PROOFING are achieved in one simple operation when you use S/V Fabrisec M.P.

This compound can be applied in a cold water bath. No special equipment or supplies of solvents are necessary. This means there are no toxic fumes or fire hazards resulting from its use.

The laboratory photographs at the left demonstrate the high efficiency of this product. Already, millions of yards of cloth have been successfully treated with it.

For complete details and quotations of price, get in touch with our representative. He will gladly supply this information and cooperate with your men to apply this product in your own mill processes.

GARGOYLE

Process Products

SOCONY-VACUUM OIL CO., INC.

STANDARD OIL OF NEW YORK DIVISION • WHITE STAR DIVISION • LUBRITE DIVISION • CHICAGO DIVISION
WHITE EAGLE DIVISION • WADHAMS DIVISION • SOUTHEASTERN DIVISION (BALTIMORE) • MAGNOLIA PETROLEUM COMPANY • GENERAL PETROLEUM CORPORATION OF CALIFORNIA

THESE PRODUCTS ARE AVAILABLE SUBJECT TO NATIONAL WARTIME REQUIREMENTS

For Navy Blues

Pharmasols

Blue GNXX
Blue GDNN

THESE azoic colors, for printing cotton, linen or rayon, produce Navy Blue of good fastness at a low cost. In combination with the Pharmasol Yellows they produce deep Browns.

PHARMASOLS are stabilized solutions, adjusted to the most practical concentration, which can be easily applied with a maximum of efficiency.

PHARMASOLS do not decompose and thereby they overcome the otherwise problems of troublesome dissolving.

For Bright Blues

Indigosol

BLUE IBC

THE outstanding soluble vat color for producing bright Blues in any depth, of excellent fastness, is Indigosol Blue IBC. It is suitable for dyeing, padding and printing on cotton, linen or rayon (excepting acetate fibres) where maximum fastness is required.

Indigosol Blue IBC is an important member of the group of very fast Indigosols, all of which are readily soluble and easily developed.

CARBIC COLOR AND CHEMICAL CO., INC.

451-453 Washington Street, New York City

BRANCHES:
PHILADELPHIA
PROVIDENCE HAMILTON, ONT.
CHARLOTTE, N. C.

IMPORTERS OF THE MANUFACTURES OF
DURAND & HUGUENIN S. A.
BASEL, SWITZERLAND

EXCLUSIVE DISTRIBUTORS OF
PHARMASOLS
PHARMOLS
PHARMACINES

Representative: Los Angeles (Hathaway Allied Products)

AMERICAN DYESTUFF REPORTER

A. P. HOWES
Publisher

LOUIS A. OLNEY
Directing Editor

NORMAN A. JOHNSON
Managing Editor

MYRON D. REESER
Advertising Editor

Official Publication of the Proceedings of the American Association of Textile Chemists and Colorists

APRIL 13, 1942

VOLUME 31 NUMBER 8

American Dyestuff Reporter, Vol. 31, No. 8, Apr. 13, 1942. Published every other Monday. Copyright, 1942, by Howes Publishing Co., 440 4th Ave., New York, N. Y. Domestic subscription, $5.00, Canadian, $6.00, Foreign, $6.00. Entered as second-class matter, Nov. 6, 1919, at the New York, N. Y., Post Office, under the act of March 3, 1879.

Contents

Contents of previous issues can be found by consulting the Industrial Arts Index at your library

• Special Article

Pigment Padding Processes of Applying Vat Dyes..... 171
W. E. Hopkins

• Proceedings of the American Association of Textile Chemists and Colorists

Calendar of Coming Events..... P173

Open Forum Meeting, Southeastern Section..... P174
Reported by Robert W. Philip

Improved Economy in Handling Print Room Back Greys P182
Edwin Farnworth

Recent Uses for Luminescent Pigments..... P183
Robert W. Joerger

General Properties and Commercial Uses of Anionic Dispersing Agents P186
A. G. Richards

Meeting, New York Section..... P190

Membership Applications P191

Unemployment Register P192

• Departments

Trade Notes—New Products..... 195

Copyright, 1942, Howes Publishing Co., Inc.

PURE enough for your table... but not for Calco's needs!

Pure and inviting as the finest of table salt may appear, it still isn't pure enough for certain of Calco's needs. Of the seven salt grades we use, two must be even more free of impurities than salt which is perfectly suited for table use. Three other types are as highly refined as table salt—and the other two grades depart only slightly from the standards of appearance and purity for table salt.

Taking such care with as simple and common a compound as salt is not as extreme as it seems. For our purposes, this chemical is a raw material. Upon its behavior in chemical reactions depends the success of many Calco processes. And being extra careful with every step is the surest way we know to safeguard the quality of the dyes, intermediates and other materials we supply our customers.

CALCO CHEMICAL DIVISION
AMERICAN CYANAMID COMPANY

Bound Brook, New Jersey

Boston • Philadelphia • Providence • New York • Charlotte • Chicago

Calco Dyes are Better Buys

Calco

AMERICAN
DYESTUFF REPORTER

VOLUME 31 APRIL 13, 1942 NUMBER 8

PIGMENT PADDING PROCESSES

of Applying Vat Dyes*

NOTE: Inasmuch as this paper was presented in England, trade names common to that country appear. Domestic products of equal merit are available.

W. E. HOPKINS

EVERY dyer who is familiar with the use of vat dyes has difficulty, at some time or other, in obtaining good penetration, whether on yarn or piece. In the last few years, exacting conditions in the trade have compelled dyers to pay particular attention to this problem as the trade, in general, has been much more critical as regards results.

In view of this position, therefore, considerable interest has been taken in the pigment padding process of applying vat dyes, since it is more efficient, consistent and reliable than other modified vat dyeing processes, and, in its various forms, it has now been adopted by the trade for certain specific purposes.

The pigment padding process was originally introduced as a means of obtaining well-penetrated shades on tightly woven materials, e.g., cotton drills, duck cloths, and linen furnishings and dress goods, and yielded results which were far in advance of ordinary jig-dyed styles. However, after practical experience of the process had been gained and improvements made in padding oils and in the ordinary physical condition of vat dyes, it was realized that it offered other advantages, and for this reason it is used now for producing level pale shades on piece goods, including cotton-viscose rayon union piece goods, in all depths of shade, loose cotton and loose viscose rayon fibers, twisted viscose rayon yarns in pale shades and mercerized cottons in light shades dyed either in hank or circulating machines.

The following tables show the advantages and disadvantages of the pigment padding process compared with other well-known methods of dyeing piece goods, yarn and loose materials.

From the comparative results given in tables I and II, it is obvious that the pigmenting process can advantageously be employed in special cases for almost any type of vat dyeing and, therefore, it is recommended that dyers should consider the adoption of this process in cases where difficulty is being experienced in obtaining satisfactory results by normal dyeing processes, i.e., if the results given in the tables show that an advantage is to be gained by pigmenting.

The pigmenting process of applying vat dyes to cellulosic fabrics consists essentially of applying the dispersed and unreduced dye to the dry material and reducing the dye *in situ* with caustic soda and sodium hydrosulfite, then oxidizing, washing and soaping. Matters that need careful attention if the most satisfactory results are to be obtained, are—

(1) Satisfactory pretreatment and drying of the materials; (2) correct choice of padding oil; (3) careful selection of dyes; and (4) padding mangle.

PREPARATION OF PIECE GOODS

The preparation of a uniformly absorbent material is of great importance, since faults which only show up after dyeing may be directly attributed to a faulty prepare. In general, light goods, e.g., poplins, sheetings, etc., should be prepared in rope form, whereas heavier goods should always be processed in open width. The processes of preparation are quite normal and are—

(1) Singeing and desizing. (2) Washing and kier-boiling. (3) Washing, bleaching, scouring and washing. (4) Drying and mercerizing. (5) Washing thoroughly and drying to even width.

Mercerizing may be carried out before bleaching or, in some cases, after dyeing. It is not always necessary to bleach the goods, e.g., when they have to be dyed in deep shades. The goods should be evenly dried prior to padding, otherwise the absorbency of the material for the padding liquor will vary with the moisture content of the cloth and result in uneven padding.

Heavy cotton drills and uniform cloths are usually dyed in the grey state and should be particularly well singed. Also, these goods, in open width, should be thoroughly boiled with caustic soda prior to padding, in order to remove "motes" which may give a speckled appearance to the resultant dyeings, especially with light shades.

Linen piece goods should not be processed in rope form prior to padding, and care should be taken to ensure that

*Reprinted from the Journal of the Society of Dyers and Colorists, December, 1941.

TABLE I

Comparison of the Results Obtained in Dyeing Piece Goods by Vat Dyeing Methods

	Pigment Padding	*Leuco-Vat Dye Padding*	*Jig Dyeing*	*Dyeing or Padding with Soledon Dyes*
Shades	All Depths available	Only light shades practicable	All depths available	Only light shades available
Levelness	Very good, especially in light shades even with blue vat dyes	Moderate	Relatively poor, particularly in light shades	Excellent
Washing fastness	Very good; longer the reduction process, the better the fastness	Poor, but improved by further reduction on the jig	Excellent	Moderate; improved by reduction, oxidation, etc., as in vat dyeing
Penetration	Very good to excellent	Moderate	Unsatisfactory	Excellent
Production	Padding may be continuous, but reduction and further processing are not continuous	Continuous	Not continuous	Padding method is continuous
Advantages and disadvantages	Production is fairly rapid and consistency of results is obtained. Shade matching is fairly simple and all types of shades are readily obtained with a greater choice of suitable dyes. Fastness is quite satisfactory as well as the levelness and penetration of shades. Better tone results on cotton-viscose rayon piece goods	Yields only mediocre results. Satisfactory for pale shades only. Limitation of satisfactory dyes. Difficult to work with combinations. Washing fastness of an inferior order	Consistency of results is not good, penetration is poor and levelness is poor in pale shades with many dyes	Only satisfactory for pale shades, but results are excellent

TABLE II

Comparison of Results Obtained in Dyeing (a) Loose Cotton and Viscose Fibro; (b) Mercerized Cotton and Viscose Rayon Yarns; and (c) Yarns on Cheeses, Bobbins, Cops, Cones and Beam Warps

(A) and (B)	*Pigmenting Process*	*Dyeing Process*
In open vessels	Pigmenting occurs evenly throughout the dry mass on wetting out and therefore level shades are obtained. No retarding agents are required. Excellent penetration	Unlevel shades. Retarding agents required with many dyes. Penetration of an inferior order
In circulating machines	Specially recommended for pale shades. Pigmenting is even without filtration and since reduction takes place *in situ*, level shades are obtained. Particularly suitable for pale shades, yellow green and blue-violet mixtures	Difficulty in obtaining level pale shades with many dyestuffs for which retarding agents are required
(C)		
In open or closed circulating machines	Specially recommended for dyeing pale shades, particularly mixtures. Level and well penetrated dyeings obtained without using retarding agents	Level pale shades obtained with difficulty, especially in mixtures, for which retarding agents are necessary.

the surface of the cloth is not injured mechanically. Linen goods are often causticized prior to dyeing by treating them in open width with caustic alkali and allowing them to lie before being washed, scoured and framed or stentered to regular width.

LOOSE COTTON, VISCOSE RAYON AND COTTON YARNS

Loose cotton is usually boiled in alkali, bleached and dried prior to padding. It need only be bleached when light and bright shades are required. Viscose rayon goods are scoured in hot soap and ammonia or hot soap and soda solutions prior to washing and drying. Bleaching is not necessary since this is usually carried out after the desulfurizing treatment during manufacture.

Cotton yarns are also kier-boiled and bleached, if necessary, prior to washing and drying. If the pigmenting process is to be carried out in pressure machines, pretreatment of the yarn may also be carried out in these machines.

PADDING OIL

Much of the success of the pigment padding process depends on the use of a suitable padding oil and considerable study has been given to this problem with the result that Calsolene Oil HS has been found to comply with all the required properties and is, therefore, specially recommended for pigment padding. This product has been in universal use for a considerable period and yields excellent results. Padding oils should possess the following properties—

(1) High efficiency in wetting out fibers over a wide

(Continued on page 193)

PROCEEDINGS OF THE

American Association of Textile Chemists and Colorists

APRIL 13, 1942

Officers of the Association

THOMAS R. SMITH, *President*
Wiscassett Mills, Albemarle, N. C.

ROLAND E. DERBY—CHARLES A. SEIBERT, *Vice-Presidents*

WILLIAM R. MOORHOUSE, *Treasurer*
National Aniline & Chemical Co., Boston, Mass.

HAROLD C. CHAPIN, *Secretary*
Lowell Textile Institute, Lowell, Mass.

LOUIS A. OLNEY
President Emeritus and Chairman of the Research Committee
Lowell Textile Institute, Lowell, Mass.

COUNCILORS

Representing Sections

FREDERIC A. PRISLEY; ALLISON R. FLETCHER (Rhode Island)
WILLIAM EBERSOLD; JOHN F. McCOY; WILLIAM A. STRINGFELLOW (Philadelphia)
J. ROBERT BONNAR; J. ERNEST MEILI; GEORGE A. MORAN; HAROLD W. STIEGLER (New York)
DEXTER R. KNEELAND; CLARENCE L. NUTTING (N. New England)
L. M. BOYD; ALBERT H. GRIMSHAW (Piedmont)
PERRIN N. COLLIER (South Eastern)
J. D. MOSHEIM (South Central)
ELMER F. SMITH (Midwest)

Past Presidents

ELVIN H. KILLHEFFER; P. J. WOOD; ROBERT E. ROSE; WILLIAM H. CADY; ALBAN EAVENSON; CARL Z. DRAVES

Local Sections and Their Officers

Northern New England Section

John N. Dalton, Chairman, Pacific Mills, Worsted Division, Lawrence, Mass.
Edward S. Chapin, Secretary, W. C. Durfee Co., Inc., 114 Federal St., Boston, Mass.
Kenneth H. Barnard, Vice-Chairman; John H. Grady, Treasurer

Rhode Island Section

Ben Verity, Chairman, Carbic Color & Chemical Co., 6 Pine St., Providence, R. I.
Iver W. Fallstrom, Secretary, Arnold Hoffman & Co., 55 Canal St., Providence, R. I.
Howard V. King, Vice-Chairman; R. R. Farwell, Treasurer

New York Section

Harry R. Tisdale, Chairman, American Dyewood Co., 22 East 40th St., New York, N. Y.
Norman A. Johnson, Secretary, American Dyestuff Reporter, 440 4th Ave., New York, N. Y.
P. J. Kennedy, Vice-Chairman; Edward H. Schmidt, Treasurer

Philadelphia Section

Arthur E. Jones, Chairman, Alco Oil & Chemical Corp., Philadelphia, Pa.
Boyce C. Bond, Secretary, 10 Meridith Road, Overbrook, Philadelphia, Pa.
James P. Conaway, Vice-Chairman; George E. Kohn, Treasurer

Piedmont Section

Thomas W. Church, Jr., Chairman, Highland Park Manufacturing Co., Charlotte, N. C.
Robert D. Sloan, Vice-Chairman; C. Norris Rabold, Treasurer
D. Stewart Quern, Secretary, Becco Sales Corp., 1021 W. Palmer St. Charlotte, N. C.

South Central Section

Jack Anderson, Chairman, Peerless Woolen Mills, Rossville, Ga.
Daniel A. Torrence, Jr., Secretary, 17 Crescent Park, Chattanooga, Tenn.
William J. Harrison, Vice-Chairman; Joe T. Bohannon, Treasurer

Midwest Section

Archie G. Alexander, Chairman, Phoenix Hosiery Co., 320 East Buffalo St., Milwaukee, Wis.
J. Gordon Stott, Secretary, Ciba Co., Inc., 325 West Huron St., Chicago, Ill.
James S. Morrison, Vice-Chairman; A. J. Feit, Treasurer

South-Eastern Section

Robert J. McCamy, Chairman, Pepperell Mfg. Co., Lindale, Ga.
Lee L. Baker, Secretary, Tesco Chemical Co., Atlanta, Ga.
C. Russell Gill, Vice-Chairman; T. A. Davis, Treasurer

Lowell Textile Institute Student Chapter

Ernest Peter James, Chairman; Stanley Szopa, Secretary

North Carolina State College Student Chapter

George W. Funderburk, Jr., Chairman; William R. Ivey, Jr., Secretary

Philadelphia Textile School Student Chapter

Joseph E. Dunson, Chairman; Ernest Stewart, Secretary

Members should notify the **Secretary** immediately of all address changes

CALENDAR of Coming Events

Meeting and Social Evening, New York Section, Swiss Chalet, Rochelle Park, N. J., April 24, 1942.

Meeting, Piedmont Section, Sir Walter Hotel, Raleigh, N. C., April 18, 1942.

Meeting, Mid-West Section, Schroeder Hotel, Milwaukee, Wis., April 18, 1942.

Research Committee and Council Meetings, North Carolina State College, Raleigh, N. C., April 18, 1942.

Meeting, Northern New England Section, May 15, 1942.

Meeting, Southeastern Section, Atlanta, Ga., June 6, 1942.

Annual Outing, Philadelphia Section, June 12, 1942. Place to be announced later.

Annual Meeting and Convention, Atlantic City, N. J., October 15, 16 and 17, 1942.

OPEN FORUM MEETING

Southeastern Section, Columbus, Ga., March 21, 1942

Reported by ROBERT W. PHILIP*
Editor of "Cotton"

DISCUSSION of practical plant problems and other timely topics constituted the program of the regular meeting of the Southeastern Section, held at the Waverly Hotel, Columbus, Ga., on Saturday evening, March 21. Last September at Macon this group initiated the "open forum" style of discussion, wherein the members of the section participate in a round-table discussion of a prepared set of questions, with no prepared addresses. The results were so interesting and the idea so well received that a similar program was held at the meeting last month, and it, too, was most helpful and stimulating to all of those present. The attendance was about 125 members and visitors, and there was full participation by a large number of the delegates.

***Mr. Philip prepared this detailed narrative of the Columbus discussion for the April issue of *Cotton*. Due to the fact that there were no prepared papers, and to the impracticability of securing an accurate report of this extremely worthwhile discussion otherwise, he has made it available, after a suitable check for accuracy, for publication in the Proceedings prior to its publication in *Cotton*.**

Robert J. McCamy, assistant superintendent of the Pepperell Mfg. Company, Lindale, Ga., presided at the meeting, as chairman of the section. He announced that the next meeting of the section will be held in Atlanta on Saturday, June 6. He introduced prominent visitors, including Jack Sands, who attended the meeting as representative of the newly-found student chapter of the association at the Georgia School of Technology, in Atlanta, and William H. Cady, chief chemist of the U. S. Finishing Company, past president of the Association, who was in Columbus for the meeting.

Mr. McCamy then outlined the plan of the discussion meeting, and called on John P. Harrison, assistant general superintendent, Georgia-Kincaid Mills, Griffin, Ga., to preside over the discussion as chairman of the program committee. In turn Mr. Harrison presented Thomas A. Davis, superintendent of dyeing, Muscogee Mfg. Company, Columbus, to lead the discussion on the first two of the five questions forming the basis of the program. The first question presented by Mr. Davis was with regard to problems of the hosiery dyer as a result of conditions produced by the war situation, and read: *"What are the problems of the hosiery dyer in dyeing high twist rayon along with nylon and cotton yarns, and how can they best be handled?"*

DYEING RAYON-NYLON-COTTON HOSIERY

John T. West, dyer at Shannon Hosiery Mills, Columbus, was the first to discuss this question, reporting that when his mill started running rayon-and-nylon, he encountered a problem of the size in the nylon yarn running down and causing spots on the rayon welts. He said they determined this was caused from wet steam melting the size and causing it to run down, and that by properly trapping the steam lines this source of the trouble could be eliminated, but that his present problem is what to do with the hosiery that was damaged in this way; he has tried boiling out with caustic, and stripping in the usual way, and other things, but has not been able to remove the spots in order to reclaim the stockings, and asked for suggestions. He said the spots gave the appearance of uneven dye spots.

Mr. West did not know the composition of the size used on the nylon yarn, and some members suggested that this was probably polyvinyl alcohol or possibly methyl cellulose. Norman H. Arnold, of R. & H. Chemicals Division of du Pont, suggested the possibility that if the size were water-soluble it should come off with a good soap and water emulsion, but Mr. West had tried this without success. A. R. Macormac of Auburn suggested that if the spots had been "set" on the rayon by steam pressure as explained by Mr. West that undoubtedly further polymerization had taken place and that if an emulsion of soap wouldn't work he might try sulfonated alcohol, but said, "if it has been 'baked' on there you have a difficult problem I can't help you much with, but the way to attack it is through some kind of an emulsion, but whether or not you will get any agent that will disperse these spots, I do not know."

Charles P. Walker, a visitor, suggested the possibility of using some of the colloidal clays, whose use has been recently revived, or possibly some of the fatty alcohols. George H. Small, of National Oil Products Co., pointed out that the problem involved a combination of the size used on the nylon with that on the rayon yarn, and this might be a good approach to it. J. W. Simmons, of Stodghill & Company, explained that if the nylon size is methyl cellulose, it would be insoluble in hot water but soluble in either cold or lukewarm water.

E. P. Davidson, of the dyestuff division of E. I. du Pont de Nemours & Co., Charlotte, submitted the sug-

SNAPPED AT THE OPEN FORUM MEETING, SOUTHEASTERN SECTION, MARCH 21, 1942

Robert J. McCamy, Asst. Superintendent, Pepperell Mfg. Co., Lindale, Ga., and chairman of the Southeastern Section.

Thomas A. Davis, Superintendent of Dyeing, Muscogee Mfg. Co., Columbus, Ga., and treasurer of the Southeastern Section, who led the discussion on dyeing.

Paul M. McLarty, Overseer of Bleaching, Thomaston (Ga.) Bleachery, who led the discussion on bleaching and finishing.

Paul K. McKenney, President, Swift Mfg. Co., Columbus, Ga., who led the discussion on conservation of materials.

Left to right—Norman H. Arnold, R & H Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Atlanta, Ga.; Joe W. Richardson, Superintendent of Bleaching, Russell Mfg. Co., Alexander City, Ala., reporting on bleaching substitutes; L. L. Bamberger, Purchasing Agent, Lanett (Ala.) Bleachery and Dye Works; C. A. French, Industrial Heat Engineering Co., Greenville, S. C., who discussed radiant energy drying.

Photos by Robert W. Philip

Below:—Left to right—Perrin N. Collier, Vice-President and Director of Research, Callaway Mills, LaGrange, Ga., and councilor of the Southeastern Section; S. J. Davis, Chemist, Callaway Mills; Allyn J. Morse, General Manager, North Georgia Processing Co., Toccoa, Ga.

Below—Among those shown in this group are: John T. West, Overseer of Dyeing, Shannon Hosiery Mills, Columbus, Ga.; Gordon Mungall, Asst. Superintendent and Dyer, Avondale Mills, Pell City, Ala.; O. G. Edwards, Director of Research and Chief Chemist, Avondale Mills, Sylacauga, Ala.

gestion of pure carbon tetrachloride for removing the spots. Mr. West said he had not tried this. Another visitor, Mr. Morrison, was called on, and said he had encountered the same trouble and the only solution he had found was "to let the damaged stockings go as seconds." He said they had tried all of the possible remedies suggested at the meeting, and that these spots "seem to be cooked in there. You will find the same thing on cotton welts; when you strip you find the spots in the same way and with the same degree of strength." He said that possibly wetting-out with a sulfonated oil before pre-boarding might help to prevent the spots, but that he had found nothing to take them out after they are baked in there. Fred W. Silver, superintendent, Archer Hosiery Mills, Columbus, said they had encountered similar spots on cotton welts, and that stripping with sulfoxylate in an acid bath had helped some.

William B. Griffin, of Atlanta, representative of Kali Mfg. Company, next discussed the original question, saying in part: "Since silk has been eliminated from the hosiery field and nylon is virtually out of the picture, a few pointers on the problems connected with dyeing rayon may be of interest because rayon will supply the bulk of fibers to the hosiery mill. First we have the so-called high twist rayons—100 denier, 25 turns, and 75 denier, 40 turns—and in order to set this twist so it will not kink in the knitting it is necessary on some of these yarns to put in a considerable amount of sizing material; this is done by the throwsters who have been handling silk, and each throwster has his own idea as to how much oil or what type of oil to use—some use a straight oil, some an emulsified oil, and some will use more sizing material than others and by the time the dyer gets his hosiery he is not sure what he has. If the yarn is treated with a small amount of soluble oil, his scouring problem is simple, but if he is not sure just what has been done, it will be safe for him to use a high enough percentage of boil-off or scouring material to scour the most difficult lot of the bunch.

"Another point is that the different rayons have different affinities for dyestuffs. We have the viscose process rayons mostly, and in them the bright, semi-dull and dull yarns, and then we have the cuprammonium type, and along with them we have both plain cotton and mercerized cotton. All of these fibers have different affinities for dyestuffs; and even a bright viscose yarn, for example, produced by one manufacturer, while the same thing chemically as another bright viscose yarn produced by another manufacturer, will have different dyeing affinities.

"With all kinds of yarn being so scarce, every mill is anxious to get any kind of yarn they can, and put different kinds through the mill together, and when the dyer finally gets the hosiery it may contain one type of rayon in the leg and another type in the welt. The most valuable thing I have seen done toward getting uniform dyeings is to have the mill knit up swatches of the different rayons they are using—bright, semi-dull, dull, cuprammonium, etc., plain cotton and mercerized—and then have the dyer dye up these swatches with his regular direct dyestuffs to see just what he must expect, because when we know we have these various combinations we can select dyestuffs to dye these fibers in the same bath. I have seen cases where they had a bright, high-twist rayon leg and a semi-dull rayon welt from another manufacturer, dyed in the same bath, and the shades would be greatly different; the welt would be almost white and the leg would be up to shade, and no method has been devised to dye these fibers in the same bath in exact union. So the dyer must get co-operation from the mill, so I suggest dyeing up different swatches of these different yarns so the dyer will be informed as to what rayons can be mixed—and the dyer will thus be helped out of most of his trouble."

Closing the hosiery discussion, Mr. Davis announced the program had been made varied to appeal to the interests of as many of the diverse groups in the section as possible, and the next question was, *"What are the problems of the cotton dyer when using cotton from white, black and red lands, both compressed and flat bales, and what is the best way to open and mix for best results in the dyehouse?"* Mr. Davis asked Fred G. Barnes, cotton buyer and sampler for the Bibb Mfg. Company, Columbus, to discuss this.

DYEING DIFFERENT COTTONS

Mr. Barnes won the warm commendation of cotton dyers by pointing out that "cotton is not all the same" and that different cottons should not be expected to dye the same. He described the effect of soil on the dyeing as well as spinning characteristics of cotton. Cotton of the same grade, for example, Middling, he said, when grown on sandy land will have a dead-white background, that grown on red-clay land will have a creamy appearance, and that grown on black land will be entirely different—all of these appearances being noticeable, yet the commercial classification is the same, "but when you try to dye pastel shades on that cotton with three distinct backgrounds, how can you expect to get uniform results? It is a good idea to know the section of the cotton-growing belt from which all of your cotton comes, and the buyers can help you out on that." He told of one case of 300 bales, all coming from the same general area, on which he had his weighers take each bale and look for the local county tags, and they found this cotton came from 65 towns in five states. "How could you expect to dye all of that cotton evenly, with different chemical analyses, because, for example, one farmer would use one kind of fertilizer, and one another, one an acid, one a vegetable type of fertilizer, another no fertilizer at all?"

Then, again, he said, "you will have fine and coarse cottons. The coarse cottons have a higher content of cellulose, and the fine type a smaller amount of cellulose, one is more soluble or absorbent than the other. If you manufacture your yarn and try to dye it in spools or beams, with fine fibered cotton it takes more fibers to the cross-section to make the same size of yarn because it is more compact." Mr. Barnes suggested that those interested in cotton characteristics could get considerable information on the copper test used on various cottons by applying to Dr. Conrad, of the Southern Regional Research Laboratory at New Orleans, Dr. Milton Harris at the Textile Foundation in Washington, and Dr. M. E. Campbell at Clemson College.

Mr. Barnes, talking next about compressed and uncompressed cottons, said there had been a world of discussion on the subject of dyeing and running these two kinds of packing, but that there is no difference in the world "provided you prepare that cotton properly before you put it in the vat to dye." He said they have run thousands of bales of Egyptian cotton packed to 22 pounds density in the same machines with domestic cotton and had no difficulty because the cotton was properly prepared. "I do not think it makes any difference whether the cotton is compressed or uncompressed if you will loosen it up enough in the preparatory processes; the dye will penetrate it just as well."

Curt Mueller, superintendent of dyeing and polishing at the Bibb Mfg. Company, Macon, Ga., indicated that the dyer's path is becoming smoother, because after all these years, "the cotton buyer is just beginning to realize that differences in cotton mean a great deal to the dyer. You know, we used to bleach a lot of cotton, and we would get some blue cotton and some red-stained and some creamy, and they would say to us, 'Why can't you make the same kind of bleach from all that cotton?'—and all of us know that creamy cotton gives a better bleach than blue cotton, and the same thing applies to the dyeing; we know that creamy cotton is a better-dyeing cotton." Mr. Mueller then pointed out that perhaps the "biggest pain in the neck" to a dyer is the problem of immature fibers; that the unripe fibers simply will not dye properly, and indicated that he had most of this trouble with "western" cotton, because, he said, of faster picking of the crop out there, which produces a lot of immature fibers along with the ripe ones.

Robert J. McCamy said "western cotton" is practically a "cuss-word" with dyers in his neighborhood, but admitted that might be unfair to the western varieties of cotton, but "that is the way it is." He experienced great difficulty last fall, he said, from different characters of cotton coming from the West, from very fine fibers on down to a coarse-fibered cotton, and asked Mr. Barnes for information on this subject. Mr. Barnes said the subject of character of cotton, which is not subject to the identification of commercial classification, is a most important point. He said that generally speaking, the cotton from west of the Mississippi River is what most people have trouble with on this point, and reverted to his discussion of the different areas in that part of the growing belt, pointing out that Texas has black land, sandy land, and other kinds; that around Lubbock in the western part of the state, the character of the cotton is relatively weak, whereas near and north of Dallas it is better. He also said there is more immature cotton from the western part of the state, indicating that perhaps this results from the use of the half-and-half variety, although he said in recent years this area has improved its seed and is getting a better character of cotton than previously.

Mr. McCamy asked whether the difficulty in character came from the land or the seed, and Mr. Barnes said it is the land because the same variety of cotton will produce the same character in each section. He told of visiting a station of the Department of Agriculture in Arkansas where they are making efforts to breed better varieties, and that they are doing wonders in this direction, particularly in developing varieties with exceptional tensile strength that will be of value to tire fabric mills. He mentioned they have produced a plant that grows conically, in the shape of a cedar tree, with the thought of making more feasible the practice of mechanical picking, which he said may be nearer than we think. On the matter of soil analysis, he said, the station is making efforts in this direction but they are disappointing because one time they had sent out 2,000 requests for soil to be analyzed and had received six replies.

Mr. Davis observed that practically all of the cotton they had difficulty in dyeing came from far western Texas, that it was "fine-fibered" and would "pack as hard as any concrete you ever saw when we put it in the rawstock machine." He asked Royce C. Smith, superintendent of dyeing, Swift Mfg. Company, Columbus, to discuss the original question.

Mr. Smith said, "Right after Christmas we were having a lot of bad dyeings on cotton, and our superintendent saw Allen Jones [superintendent of Muscogee, where Mr. Davis is dyer] and asked him if they were having any trouble, and Mr. Jones said, 'No, we're not having any,' and that sort of put the 'bee' on me. Then the next morning Tommy Davis called me up and asked me if I was having any trouble!

"Tommy said he was putting in all kinds of penetrating agents and we tried the same thing but didn't get to first base. I was still look for sympathy and I went to Mr. Williams [the chairman of the board] and Mr. McKenny [the president of the mill]. Mr. Williams was very much upset about it, but Mr. McKenney let me know it was my baby and I had to spank it. I went to work on it, and found that by very careful loading, and paying a great deal of attention to the method of dyeing, we have got the dye to penetrate a little better. Recently we have not had but one or two batches that showed up bad. I think that

when they get to rushing—as everybody has to do nowadays—they let it slip a little, and we have to watch them about that."

"At Muscogee," commented Mr. Davis, "we had a lot of trouble with Texas or western cotton and we finaliy worked out a way out of it: we are now using local cotton."

William H. Cady was asked to discuss the subject. He said it was a most interesting one, but as he had not dyed any rawstock cotton in 25 years he was not in a position to discuss it, but said, "it does seem to me as if it comes down to studying the fiber itself, microscopically or analytically, to find out what causes these troubles, whether it is the fineness of the fiber, foreign materials, or oils, or what. It seems to me this is more of a job for the analyst than one for the dyer."

Mr. McCamy said the thing gave him so much trouble that he was wondering whether a heat-treatment of the fibers before dyeing might help out. He said he did not have the equipment for doing this available and wondered whether anyone else might have tried it, but no one reported such a test.

Mr. Davis said he had tried every available penetrant and emulsifying agent available on this fine-fibered cotton but had found nothing that would emulsify the oil that seemed to form in the lower center of the dyeing machine on this cotton, which he said resembles white vaseline, and that maybe this element in this cotton may have something to do with the way it packs up in the machine.

Paul M. McLarty, overseer of bleaching, Thomaston (Ga.) Bleachery, conducted the discussion on the next two questions, which pertained to finishing and bleaching. He read the third question on the list: *"What are the advantages of radiant energy (high temperature) drying for textiles?"* and asked L. L. Bamberger, purchasing agent, Lanett (Ala.) Bleachery & Dye Works, to open the discussion on it.

RADIANT ENERGY DRYING

Mr. Bamberger said that sometimes it seems that all of the spectacular developments and advancements in textile processing are in the past, but that every now and then, some outstanding advancement does come along, and that he regards the use of radiant energy in drying as one of these. He explained radiant energy drying as being the utilization of the same invisible energy that radiates from the sun to the earth; that there is a small amount of sensible heat developed and along with this is a large amount of this radiant energy which will travel through most obstacles. This energy is utilized by the use of lamps or by using incandescent refractories which liberate, from any type of heat source, large amounts of infra-red energy and smaller amounts of ultra-violet energy. The use of radiant energy drying, he said, has produced some efficiencies previously unheard of, with an accompanying remarkable speed of operation, and material reductions in cost, with large reductions in the space occupied by the equipment. He called on C. A. French, of the Industrial Heat Engineering Co., of Greenville, S. C., as a pioneer in the application of radiant energy drying to textiles, to discuss the subject further.

Mr. French pointed out that the chief advantages in this type of drying are: increase in speed, reduction in cost, and reduction in space required—as compared to the dry-can and tenter method of drying. He said the method involves the utilization of invisible rays of 6400-7000 Angstrom units, and provides temperatures of close to 380° F.; that between there and about 700° something like 60 per cent of the radiant energy of the invisible rays is given off; of the whole energy about 70 per cent is radiant energy, and about 70 per cent of that is infra-red rays, or about 49 per cent of the total.

He pointed out that with this type of heat, "you do not have to do any work on it to make it effective, no fans and no blowers, as the heat energy penetrates and does its work alone"; that it results in a heater with such efficiency that, "in front of a tenter, for example, you can have a dryer only 12 feet in length that will take 75 to 80 per cent of the water out of 4.00-yard goods running at the rate of 100 yards per minute—if you want to complete drying you can achieve this by adding two feet to the length of the drying unit."

Mr. French explained that, of course, steam is the cheapest heat, provided it *is* cheap, going on to say that with steam at 30 cents per 1,000 pounds, it is pretty cheap—producing 3 therms of heat, whereas a comparable production with furnace oil or butane gas would be more expensive.

He explained that with the use of refractories, radiant energy heat could be produced from any common heat source.

Mr. French said that one major difference between normal forms of textile drying and this new method is that radiant energy heat is a direct heat as compared with the indirect heat secured by using dry cans or tentering; in those methods, he said, "first you burn coal, to make steam, to heat air, to dry the cloth."

He said they had gone further, in textile applications, with the use of the method for driving solvents out of pigment-resin dyed goods before curing, but that it has been applied to other textile purposes.

In a question period following his description, Mr. McCamy asked Mr. French specifically as to the comparative cost. Mr. French said of course this would depend on the cost of the steam, and whether or not one included in the steam cost all items that should be there, such as investment and interest on equipment, floor space, overhead, etc., as well as production costs—that if the true cost of the steam is calculated, the radiant energy method is more economical. He said the method appeared to produce a softer finish on some of the goods processed by it than did dry cans. Answering another question, he said he was not familiar with any use of the method in

drying hosiery in the boarding, and, in answer to another man, said he did not know of any application thus far to the drying of raw stock cotton.

Another man asked Mr. French what the effect of this treatment would be "where the cloth contains some of these cheap tallows that have a tendency to turn the cloth yellow?" Mr. French replied they had had no trouble at all with burning the cloth, that "with water in it you cannot get cloth above about 165°." He added that the process had been applied to drying Turkish toweling, among other fabrics.

Gordon Mungall, assistant superintendent and dyer, Avondale Mills, Pell City, Ala., reported the use of this type of drying—through the use of 21 units of 300-watt bulbs—in connection with blanket drying in Sanforizing denims; that while the experience is not yet extensive, it appeared thus far to permit an increase of 6 yards per minute in the speed of the machine, to keep the blanket drier, and to give a little more yardage to the life of the blanket. He said the bulbs cut off when the machine is stopped. Mr. French explained that with the burner-and-refractory method, pieces of Transite insulation are used to prevent damage, when the machine is stopped, by introducing these impervious materials between the source of the radiant energy and the material being dried.

Mr. McLarty next submitted the fourth question, which turned the attention of the meeting to problems brought on by scarcities produced by the war economy. It was, *"What do you intend doing to secure suitable bleaching agents as the supplies of your present materials become unobtainable?"*

REPLACING PRESENT BLEACHING AGENTS

Joe W. Richardson, superintendent of bleaching, Russell Mfg. Co., Alexander City, Ala., made an extensive report on this subject, saying in part:

"This question is one of the most important ones confronting the textile industry today. I have been asked this question by no less than 100 people, and the more I investigate it, the larger the question mark seems to grow.

"We are now bleaching knit underwear with hydrogen and sodium peroxide; knit sweaters and sweatshirts with chlorine; and cotton woven goods with chlorine.

"According to present information we will be able to continue with our peroxide bleaching if no more is required than was used last year, but our consumption of chlorine must be cut in half, and it is the common belief that this will be cut still lower in the near future. Chloride of lime will not be available, either. It is impossible, as well as impractical, to manufacture chlorines for our own use because of the cost and the scarcity of materials that are required to make the machinery.

"I have been doing some experimental work to find another satisfactory method of bleaching, and have here some samples showing the results. [These samples were passed through the audience for examination.]

"A piece of carded 80x60 broadcloth was used. It was singed and soured with sulfuric acid and boiled with caustic soda, tetra sodium pyrophosphate, and a kier assistant which we make in our plant. It was then washed cold in a tight rope washer. Part of this sample was dyed without further treatment.

"To improve the whiteness, three different treatments were tried:

"1. Soaping with chip soap and sodium perborate. (The white produced by this method was almost as white as chlorine.)

"2. Soaping with sulfonated fatty alcohol type soap.

"3. Soaping with tallow chip soap.

"The degree of whiteness was improved by each treatment, as is to be seen by examining the samples. The first method cannot be a safe bet, because if it is adopted by many bleacheries, sodium perborate will become more scarce.

"I have dyed three pastel shades on the boiled bottom. A few motes may be seen if examined closely, but it is my opinion this will be accepted by the trade. The shades will be almost as bright as they would have been on a bleach bottom.

"It is my opinion that all bleacheries should conserve chlorine by dyeing all shades, including bright pastels, on the boiled unbleached bottom, thereby leaving more chlorine for cloth which must be finished pure white."

CONSERVING MATERIALS

The final question drew the discussion still closer to consideration of means for conserving and substituting materials, and salvaging and saving of waste—the need for which has been intensified by the war. The discussion on this question—*"What can we do about conserving materials in the daily operation of our plants?"*—was led by Paul K. McKenney, president of the Swift Mfg. Company, Columbus. In introducing it, Mr. McKenney declared that in any plant there are three elements to which conservation should be applied: time, money and materials. As to time, he said someone had aptly declared that "we cannot buy back yesterday"; and in handling materials and doing a job, "we should put more stress on the fact that time is irreplaceable." He said this should certainly be carried into the conserving of the other fellow's time, also: to keep him from waiting, to keep from holding him up from accomplishing something more important.

As to the second point, he said, there is great opportunity for conservation of the talents, time and ability of a man—and a woman. "Don't you think that wherever you can get a machine that can do the job as well as or better than a man or a woman, it is a good investment?"

As to materials, he said, "after all, if we can train ourselves to get the people to work and to save time and think, and to realize the value of the materials they are handling, we will be achieving at the same time conservation of materials." He then called on Perrin N. Collier, vice-president and director of research, Callaway Mills,

LaGrange, Ga., to discuss the subject. Mr. Collier interpreted conservation to include reduction or elimination of unnecessary waste, and impressively illustrated the possibilities in saving of "small things," by reading the following striking illustrations, on "Where the Profits Go," from the advertisement of a prominent textile engineering company, published some 8 years ago. The statements are based on what may actually happen in a mill making a profit of ⅛-cent yer yard of cloth:

"When the fireman saves one wheelbarrow of coal, the mill gains the profit on 6 looms for a week.

"When the weaver makes one cut of seconds, the mill loses the profit on 2 looms for a week.

"One dead spindle in the card room costs the mill the profit on 2 looms.

"Each pound of white waste put in sweepings costs the mill the profit on 2 looms for a week.

"When a draw frame roll is spoiled the mill loses the profit on 6 cuts of cloth.

"Re-drawing one warp costs the mill the profit on 15 cuts of cloth.

"When a shuttle is broken the mill loses the profit on the loom for 6 weeks.

"The spoiling of 1 reed costs the mill a profit on the loom for 10 weeks.

"In a 100,000-spindle mill:

"When spooler boxes continually contain 1 pound less than the standard amount of yarn, the mill loses the profit on 40 looms each week.

"An average loss of 5 minutes a day through tardiness, 'washing up' early, etc., costs the mill the profit on 40 bales of cloth weekly.

"When the cloth is of apparently correct weight when baled, but the moisture content is 1 per cent below normal, the loss amounts to the profit on 50 bales of cloth weekly.

"When yarn averages a half number heavy on print cloth it costs the profit on 75 bales of cloth weekly.

"If, through the co-operation of overseers and employees, the waste can be reduced 2 per cent, the saving is equivalent to the profit on 800 looms weekly.

"A 7 per cent increase in production will reduce the manufacturing cost by 1 cent per pound on print cloth. One cent per pound of cloth will pay for all the bobbins, shuttles, reeds, harnesses, teaming, oil, belting, and roll covering, required by the mill."

Mr. Collier then passed along suggestions he had received from two members of the Callaway organization responsible for dyeing, when he asked them the question in relation to this specific work. The first listed causes of waste—and therefore opportunities for savings and conservation—in a package dyehouse:

"1. *Laboratory inefficiency*:

"a. Inaccuracy in weighing and making formula for the dyehouse.

"b. Not checking the strength of dyes before being used in the dyehouse production.

"c. Not using the same ratio of dye liquor as the dyehouse.

"d. Not selecting the proper colors that will work well together on the type of machine the material is to be dyed in.

"2. *Inaccuracy of drug clerk*:

"a. Not weighing dyes and drugs accurately.

"b. Not properly preparing the dye before applying it to the material in the dye machines, causing unevenness of color and also affecting the fastness of the color.

"c. Carelessness in not removing all the dyestuff from containers before disposing of the containers.

"d. Not keeping utensils clean, causing the color to be contaminated by other colors than the ones used in producing the desired shade.

"e. Loss of production in allowing machines to stand waiting on dyestuff.

"3. *Dyehouse*:

"a. Machinery not kept in good mechanical condition.

"b. Not following the procedure outlined by the laboratory, in adding color to machine, controlling temperature, adding salt too fast.

"c. Spilling dye while adding to dye machines.

"d. Not weighing properly the material to be dyed."

The other comment—on "Conserving Materials in a Rawstock Dyehouse"—was:

"White stock: Keep all stock picked up, and bagging picked clean; all loose stock to go into machine for dyeing.

"Dyed stock: Keep mixed colors down to a minimum. Segregate as much as possible and reclaim the various colors and put in the proper place. Reclaim mixed colored stock by stripping and re-dyeing or dyeing black. Put up colored stock in as good bagging as possible, skin off loose cotton sticking from the bales before they leave the dyehouse. Have bins available in the dyehouse for loose stock. Loose stock passing down the drain lines can be recovered by a sump pit with baffle plates in it. Waste should be held to a minimum on color changes in dryers. Loose colored stock collected around the warehouse should be segregated and put with the proper color.

"Dyes and Chemicals: Accurate and careful weighing, and constant vigil on the part of the dyer to impress on the dye weighers that they are handling expensive materials. Daily check-up on scoops, pails, buckets and empty dye drums to see that they are cleaned thoroughly. (The dye companies are buying the drums back, so we certainly don't want to give any dyestuff back to them.) The dyer should check on all of his dyeings for complete exhaustion of the dyebath. In handling dye paste from drums, rinse stirring sticks, preferably old broomhandles, pots and drum tops in a spare container and use such accumulation on one dye batch as an extra amount over the regular formula. Rotate dyeings from dark, medium to light in such a way as to keep down machine boil-outs.

"Steam, Water and Air: Good valves and constant attention to upkeep."

Mr. McKenney said he had often thought that if management were to load a truck with nickels so full that the nickels would fall off on the floor as the truck was pulled through a mill department, and the employees would, of course, stop whatever they were doing to pick up the fallen nickels, this might be an effective way of impressing upon the employees that when they see a bobbin of yarn on the floor, and, as usual, pass it by, they are overlooking an even much larger saving than if they left the nickels on the floor. He then called on Russell Gill, vice-president of Southern Sizing Co., Atlanta, and vice-chairman of the section, to discuss conservation of materials.

Mr. Gill emphasized that existing shortages in some materials are but a foretaste of more serious and extensive "squeezes" yet to come, but he recalled that in previous times of shortages and lack of supply, the industry had turned with success to substitute materials. "We can remember when imports were cut off, and olive oil was impossible to get, even at $1.50 a gallon, we realized we had an ample supply of peanut oil, at 5¾ cents—now that has gone up and has a ceiling price of 13 cents a pound. I believe the next major squeeze in chemicals is coming in those materials that are used as well for foodstuffs, such as fats, oils and sugars; there will be a scarcity of materials such as corn sugar. But there are available inorganic materials, for the weighting of cotton fabrics, such as Epsom salt, sodium chloride, etc., that we may not be used to using, but will find entirely satisfactory. There is going to be a tight situation on the organics, such as glycerine, formaldehyde, and the phenols—in fact they are already almost out of the picture. Glycerine has been used as a hygroscopic agent, and we must get some available substitute for it. Some of the phenols and formaldehydes have been used as mildew inhibitors, but there are cheap inorganic chemicals that can be substituted for them. Also, we must get accustomed to buying chemicals in wooden barrels instead of in steel drums; we may not like it as well, but we have got to do it, and it can be done."

M. T. Barnhill, superintendent of dyeing, Avondale Mills, Sylacauga, Ala., declared that from the standpoint of dyestuffs themselves, "we have found from laboratory tests that one per cent is one per cent, and we cannot do much about it unless the dyestuff companies will give us more for our money, but we have found through laboratory tests that the accepted standards for certain agents in almost all cases in excess of what you need. I do not have anything to give you on this subject except a couple of examples: Somebody said use 1 per cent of beta naphthol. We have found through experiment that that is just about twice what we actually need to use and still maintain the fastness.

"Sodium nitrite is another commonly-used agent. Three per cent probably would be recommended in dyeing most developed colors. We had a very heavy navy blue, 6 per cent, and we found by taking the nitrite and making several tests that 2 per cent was a gracious plenty, so we saved 1 per cent of that particular material.

"Other materials of which we probably use too much are soda ash, or, maybe in the bleach make-up, caustic soda and sodium sulfide.

"We are continuing these experiments, taking each particular formula at a time because just because you can do it in one case doesn't necessarily mean that it can be done in another formula. We are finding that we have some very nice savings in the mill by these laboratory experiments we are making."

Mr. McCamy recalled that all of their steam lines tie up into a central condensate system and there was no visual way of determining whether any one trap was taking out steam or water, so they made a detailed inspection, and "found most of them were putting out steam" and that resulted in repairs which produced considerable saving.

J. E. Smenner, overseer of dyeing, Bradley Mfg. Co., Columbus, like Mr. Barnhill of Sylacauga, reported reduction in quantities of materials used, saying he had cut down measurably on the amount of caustic and hydro used in vat dyeing; on the use of sodium perborate; and on the amount of ammonium sulfate on some sulfur colors.

The waste of "throwing it away" was strongly condemned by Mr. Bamberger. He declared it as his definite opinion that an average of 10 per cent of the material purchased by any type of processing plant is wasted. "This always has rested with the worker primarily, and not the overseer or second hand, he said, "and it always was a difficult thing to do anything about, and now it is a much worse job, because the second hand is worrying about wages-and-hours laws and hasn't as much time as he used to have, but there is one way to stop it—I know it isn't practical and you won't do it, but there is one way: hire one extra second hand for every workman, and you can stop it."

A. R. Macormac, professor of textile chemistry at Alabama Polytechnic Institute, declared, "It has always been my idea that when we put in a wetting-out agent we are putting in something that retards the action of a dye; and I think as a rule we are using too much wetting-out agent and I believe we could get much better money value out of our dyeings, and conserve materials, by reducing the amount of wetting-out agent even if it did require a longer time to complete the operation."

Mr. Mueller of Bibb concluded the discussion by calling attention to the fact that when dye is put on cotton, the value of the material is thus greatly enhanced, and that more care than ever should be exercised in the handling of this cotton because of the greater investment in it than in undyed material.

Improved Economy in Handling

PRINT ROOM BACK GREYS*

EDWIN FARNWORTH
Apponaug Co.

I HAVE been asked and I have agreed, I'll admit somewhat reluctantly, to give a talk on one of the major irritants in the printing industry in general and in the print room in particular.

Print room technique is far more involved today than it was yesterday—or to go back still further—a matter of 25 years ago. In those days the majority of patterns printed were of a more simple character than today. Some veteran may contest that statement and perhaps rightly so. After all, one can only speak on a matter of this kind of his own experience as one might say he gets in his own back yard.

But apart from patterns there are so many different types of dyestuff used in one pattern today that it requires expert supervision to keep a printer straightened out. The printer, in one pattern, may have to adjust his printing machine and equipment to colors that if they do not destroy each other, at least affect each other so disastrously that if not correctly taken care of, the result is spoiled merchandise.

It is not my intention to enumerate all of these pitfalls, but in the subject under discussion tonight quite a few of these instances will come to light.

The subject I am referring to is the use of back greys.

As all printers know, this major problem in the print room generally consists of a roll of cloth somewhat wider than the lapping on the cylinder and wider than the cloth to be printed. This grey serves as a back cloth to the cloth being printed and involves running through the printing machine as much of this grey as cloth. If this grey varies in width—runs off on one side—is scrimped—is damaged—carries many seams to the roll—these defects show up on the printed piece and result in seconds, cut-outs, and inquisitions. Furthermore, a pattern may have—

1 combination in vats
1 combination in salts
1 combination in Rapidogens

and if a grey roll has been used on vats and the printer uses the same grey before washing on salts or Rapidogens, the colors are destroyed. Aniline blacks and salt colors have a tendency to make greys tender if not washed at once.

In discharge work printing on tub-fast or commercial grounds, a heavy pattern will pick up color from a back grey that has been used once, with dire results.

So you see, it might easily get to a point that for every yard of cloth printed, a yard of back grey has to be washed. This is very expensive, both from an operating angle and also the high cost of greys in the present market; this gives management something to think about.

This problem through the years has had a lot of attention. My early contacts with the print room showed that even then it was a major item.

I have seen paper substituted for cloth on fine indigo discharge patterns and successfully—though this required good tension arrangements. For multicolor floral work, not blotches, an endless mackintosh blanket was used which was scrubbed in a washer similar in type to an open soaper. On account of the hard surface of the mackintosh, colors would flush, so in some cases stout partly absorptive cotton fabric was used. In those days we did not have synchronized driers and mechanism critical enough to handle light blankets of this type too successfully. Furthermore, the cloth blanket would scrimp.

You can read all about blanket washers in the Knecht and Fothergill Manual, 1924 Edition, and it makes very interesting reading:

"Of late years the use of wash-blankets has increased enormously, partly owing to improvements in the washing machines themselves, and partly to the fact that cheap, efficient, and serviceable blankets can now be obtained to withstand the extra strain put upon them. Most of these blankets consist of a single thickness of stout cotton cloth, waterproofed in various ways, and, curious though it may appear, they last better than a 3-4 ply mackintosh. For some styles it is even possible to do good work on a simple grey that has merely been passed through a solution of wax and dried, but, as a rule, a much stronger fabric is necessary. In an important continental works a strongly woven but fine canvas of the best quality is waterproofed by being passed through successive baths of soap and alum, then dried, padded in a solution of blood albumen, and finally steamed and lightly calendered. These blankets yield excellent results, and are found to be as durable as any of their kind. In many cases the quality of the blanket is much improved by mercerizing followed by the foregoing treatment, or by any of the many methods in general use for the preparation of wash-blankets.

"Numerous types of blanket-washing machines are on the market. For the most part they are based upon some application of the same fundamental principle, i.e., that of subjecting the travelling blanket to the scrubbing action of revolving brushes in conjunction with a copious supply of water.

"The proper preparation of a wash-blanket is as impor-

(Concluded on page P191)

*Presented at meeting, Rhode Island Section, October 24, 1941.

Recent Uses for LUMINESCENT PIGMENTS*

ROBERT W. JOERGER
Chemist, Hope Webbing Co.

THE most common source of light is some kind of incandescence. The biggest example of this is the sun. Most of our artificial lights are flames or the glow of hot wires. Differing from such luminous effects is luminescence. Luminescent substances give off light at relatively low temperatures and so may be said to give off "cold light." Such materials have been known for a long time, the "recent uses" referred to in the title of my talk arise from present war conditions. Action and movement in the dark would be seriously limited, and full of confusion and uncertainty, without the use of luminescent pigments. Their rather ghostly glows act as guides and have become more than a convenience, but a necessity. Their light is weak, but strong enough to be of use to us while not helping the enemy. To cite a couple of military examples: they outline the dials and instrument boards of night-flying bombers; or can be painted on ammunition to help find and identify it. In civilian defense, as blackouts are becoming more and more a reality, they can be used as signs, on curbs, for clothing. In the early months of the war, when blackouts were strange and unprepared for in Great Britain, deaths from falls, collisions, and other accidents were twice as great as during the well-lit peaceful times. Then luminescent pigments began to be used and the death rate dropped nearer to normal. We can profit from this experience.

I shall divide my talk into three parts: the properties of luminescent pigments, their application and use, and a demonstration during an actual blackout. (Five demonstrations were staged after the talk in the darkened hall. What they showed has been incorporated into the body of this paper along with the few comments.)

There are many substances that exhibit a luminescent effect but here I will mention only three general classes: the radio-active type, the fluorescent class, and the phosphorescent pigments.

(1) Radio-active pigments consist of a very small amount of radium salt bombarding a specially-prepared zinc sulfide, this producing tiny sparks of light. Because no further outside agent is necessary and because the life of the radium is long, the effect is both self-lighting and permanent. It is, of course, familiar to all of us because the dials and figures of clocks use this type of luminescence. However, it is much too expensive for general use and the health hazards during the application are also limiting factors.

(2) Fluorescent dyes and pigments are visible only while ultra-violet light rays are directed upon them. This is the so-called "black light" and is difficult to maintain, for instance, on moving people, and impossible if the electric power goes off. Because they produce brilliant and colorful effects, they have been used for beautiful theatrical interludes. Their war-time use is increasing, but this is a whole subject to itself and cannot be described further at this time.

(3) Phosphorescent pigments glow in the dark without the use of ultra-violet light (but being also fluorescent, are more brilliant with it). The inorganic salts that emit such light are the subject of this paper and will be described in more detail later.

Let us consider now this glowing in the dark. Where do these pigments get the light? How much light do they give off? How long does it last? How far can it be seen?

The light they give off has been stored by them from previous exposure to ordinary daylight or fairly strong artificial light. This glowing seen only in darkness is called *afterglow*. It lasts for several minutes or several hours depending on the chemical nature of the substance, and also to a large degree, the care taken in its manufacture. The intensity of the afterglow is rather low, especially compared with lights as we know them; and in several hours seems disappointing. A large part of this is due to the fact that our eyes have to get used to "seeing" in the dark, this taking from five to twenty minutes, depending somewhat on the person. We have all experienced a temporary blindness on entering a darkened moving-picture hall after passing through a brightly-lighted lobby. Then it is usually wise to stand in back for a few moments in order that familiar objects may become recognizable. When our eyes have become adapted to darkness, lights of very low intensity seem quite bright. In partial darkness, such as that of a moonlight night, the phosphorescent pigments have no advantage over white. On the other hand, they have little or no disadvantage, being almost white themselves. At the point where white becomes grey and darker, where white is invisible, the phosphorescent pigments glow and are clearly visible. (Demonstration: A fabric coated with phosphorescent pigment was placed between two white sheets. These were illuminated with a flashlight to show that they all looked white. Then the flashlight was dimmed by

*Presented at meeting, Rhode Island Section, February 27, 1942.

covering with a handkerchief and also by moving it away from the samples. It clearly showed that as soon as the white became greyish, the pigment-coating glowed. And when the change from light to darkness was made abrupt, the latter fairly jumped into sight.) The size and shape of the surface covered with phosphorescent pigments has a great deal to do with their visibility. The area should be large and the form as simple as possible.

How far can any light be seen at night? As a point of comparison, let me cite an example. A 25-watt electric light bulb can be seen from six to ten miles through the darkness, depending somewhat on weather conditions. The same light shining forth from an unshaded room can be seen from an airplane at 10,000 feet elevation. By contrast, even the best of these luminescent pigments can hardly be seen more than 100 feet away. And letters that have to be read at 50 feet distance would have to be one to two feet high. Their use is limited, then, to rather local guides, sufficient to help the users and difficult to detect by the more distant opposition.

The initial brightness of all the phosphorescent pigments is good. But the brightness of the afterglow fades with all, some rapidly, others lasting for a day or two. This seeming disadvantage is not so great when it is realized that "recharging" them with light is quick and easy. And if this is periodically performed, little or no loss need be noticed. Even a short exposure from an ordinary flashlight will produce a glow that lasts for some time. (Demonstration: an uncharged pigment, invisible in the darkness, was illuminated for ten seconds with a flashlight. Then an afterglow easy to see fifty feet away developed. This dramatic experiment has this practical aspect: one wearing a such luminescent pigment would receive a charge of light by every passing auto as the headlights shone upon him.) Usually, the pigments are exposed to light during the day that they may be used that night. Or a two to four hours' exposure to strong artificial light is enough. This charging and discharging of light can go on indefinitely, or as long as the life of the pigment, which is a year or more if it is properly protected.

It is best to understand the limitations of their visibility as outlined here rather than to expect too much. When these are realized, there is still left a wide range of usefulness, and their application is bound to grow, and perhaps their properties will be further improved.

I shall now talk briefly of their chemical nature and methods of making. Technically, these pigments are called *phosphors*. This word and "phosphorescence" must not be confused with the element phosphorus from which they differ both chemically and the way the light is produced. The glow of phosphorus, as any first-year chemistry student knows, is due to oxidation, a kind of burning. Historically, the first phosphor was discovered by some alchemist in the 16th century when he heated barytes and charcoal together. As chemistry developed, more and more was discovered and our knowledge of them was fairly complete by the end of the 19th century. Generally, they are the carbonates, borates, silicates, and especially, the sulfides of such metals as zinc, cadmium, and the alkaline earth group: calcium, magnesium, strontium, and barium. These substances must be pure to get the best luminosity, and yet, paradoxially, when pure they exhibit no afterglow. The impurities are added, and these are known as *activators*. Typical activators are such metals as copper, silver, and manganese. These are added in small quantities and then the mixture brought to red heat. For example, the zinc sulfide phosphor to which only four parts-per-million of copper are added, has a bright greenish-yellow afterglow. Other metals, on the other hand, act as poisons. And the worst of these is iron. No iron equipment can be used during their manufacture. In the case of one phosphor, the brightness of the afterglow is reduced by a third if it is contaminated with iron to the extent of six parts per million.

At present, there are many phosphors available and they vary widely in their properties and price. They should be carefully examined. When their use was increasing in England several years ago, there was considerable public prejudice aroused against them because of many inferior products. Only the best should be considered by us. I shall mention only a few of the more important types and simplify their nature somewhat. The zinc sulfide phosphor has already been mentioned. The afterglow is the brightest known of this class of substances and the greenish-yellow light lasts from ten to twenty minutes; is only faintly visible in two hours. Its easy visibility is an advantage and its short duration is sufficient if used for such a purpose as to illuminate exit signs of a public place which is usually quickly emptied. A story has been told to me of how a sheet covered with this zinc sulfide was hung in the operating room of a Swiss hospital. When the electric lights were suddently cut off one night, the delicate operation was continued and finished by the bright glow which this screen had stored up from the previous lighting.

The alkaline earth phosphors have an afterglow less bright initially but lasting longer. Calcium sulfide phosphor has an afterglow of deep dull violet. Since the human eye is quite sensitive to this color, it seems less bright and does not last as long as the following. Strontium sulfide emits a blue-green light that seems brighter and lasts longer. It has the disadvantage of being quite sensitive to moisture and it is more expensive than the ordinary cheap calcium type. An ounce has been quoted at $4-$5.

My work has been with an alkaline earth sulfide which exhibits a blue afterglow of fair brightness and of longer duration than any of these mentioned. The initial brightness drops 25-30% in the first half hour after been taken away from light, and is still usable in eight hours, and can be seen easily after twenty-four hours by the dark-adapted eye. Such a product now sells at five to ten dollars a pound.

(These four phosphors were demonstrated. They all glowed brightly in the dark and with different colors: yellow-green, blue green, violet, blue. It is interesting to note that the colors fade and all look more whitish in an hour or so. An easy way to prepare them for such an exhibition, is to put them between two glass plates and seal the edges with adhesive tape. This method is favored by the English as convenient and giving good protection.)

To get and maintain the best results, certain precautions must be observed. The phosphors should be protected from moisture, especially the strontium sulfide type. And this refers to their storing, during their application, and the subsequent exposure. If they are not properly protected, serious detriment to the luminosity can be noticed in six months. Though rather coarse powders, as we generally think of pigments, they must not be ground, because their luminosity depends almost entirely on their crystalline structure, if reduced to an amorphous powder they show no afterglow. Other metals are poisons, such as lead and antimony, whose dark sulfides would hide the light they have to give. Thus, a surface that is to be painted is always first thoroughly cleaned and then given a priming cost of white paint to make a bright reflecting background. This, then, must never be a white lead paint but rather one based on zinc oxide.

The vehicle to carry and bind the phosphorescent pigment to a surface or fabric must be carefully chosen. Among the outstanding requirements are:—

1. That it should be as clear as possible, as any slight discoloration will tend to reduce the luminosity.
2. No acid should be present or allowed to develop, it should be near the neutral point as possible.
3. It should protect, especially against moisture which hydrolyzes these phosphors.
4. Should be tough and durable for additional protection and long wearing qualities.

Many kinds have been suggested and tried, and generally the ordinary varnishes and lacquers are not suitable. For the special compounding of a good vehicle one may start with cellulose derivatives, with vinyl resins, polystyrene type, and methyl methacrylate. With these are incorporated the usual plasticizers and suitable solvents. Esters had better be avoided as solvents, as they are apt to develop acidity, and no oils should ever be used. Chlorinated rubber is another starting point, it having certain desirable water-proofing qualities. It is liable to turn acid and just now its non-availability is an added problem.

For actual use, phosphorescent pigments are incorporated into paints, used with plastics, and put on textiles. Luminous paint has from two to five pounds of phosphor for each gallon, and that sells from $25-$60. Almost any surface can be covered with it, wood, paper, rubber, glass, etc. Heavy coats must be applied to get the best results. Mixed with plastics, they are moulded into buttons and badges, used for jewelry, pressed into switches and switch boxes.

Our main concern here is their application to textiles. Since the coating covers the surface completely, there would not be much logic in starting with a fine fabric, such as a rayon taffeta, when cotton serves the purpose, being cheaper and stronger. The usual sheetings and twills are employed and I have seen some on the market running from 35-54".

In preparation for this treatment, the material need not be dyed:— first, because the color would be covered anyway, and, second, the final results would be less bright than where clean bleached goods are employed. I have seen good results on grey material also. A prime coating of the clear vehicle is an advantage: it fills the pores, releases the air bubbles, makes a smooth base for the subsequent coats. And if the pigment mixes were first applied, more would be used ultimately, that adding to the expense. For the same reason, only one side is coated as usually only one side is exposed during use. Coating both sides would almost double the cost.

The luminous coating mix is easily made by merely stirring into each gallon of vehicle, three to four pounds of the phosphorescent pigment. The mixture should be fluid enough to use and must be kept stirred because the pigment is heavy, would settle to the bottom and form a hard mass. Some vehicles which I have found to work well are such lacquers as a nitro-cellulose type using dibutyl phthalate as a plasticizer. In a few hours, however, it begins to thicken and finally become a stiff, unusable gel. Therefore, no more should be made up then will do the job. An acetate cellulose lacquer is apt to have this same disadvantage. More suitable are ethyl cellulose lacquers which do not jell, cannot develop acidity, and stand outdoor exposure better than the other lacquers just mentioned. Any lacquer that might be used should be first tested by spotting on a piece of white cloth, with and without the phosphorescent pigment, and exposed to the conditions under which it is to be used for a month or more. This exposure test shows whether any discoloration will take place and how much reaction with the pigment has set in.

The methods of applying such a luminous pigment mixture are many. A crude spreading by hand is possible. Spraying can be used if the mixture is made fluid enough, and low pressures are best. Screen printing would give large decorative designs, stencils, and letters. The powders are apt to be too coarse for the mess size and selection of the right pigment is necessary. Roller printing is impossible, because the hard crystals would scratch badly and the sulfides would stain. For the ordinary dyehouse or print works, the rather thick mixture can be poured on the cloth, the excess uniformly scraped to the proper thickness with a blade on a back-filling machine or before a tenter frame. But the best set-up is, of course, the regular pyroxalin-coating machine where the luminous pigment mixture takes the place of the "dope" and the doctor is adjusted to deposit the necessary amount. The pigment

(Continued on page P190)

General Properties and Commercial Uses of ANIONIC DISPERSING AGENTS*

A. G. RICHARDS

Dewey and Almy Chemical Company

MANY papers have been written on the subject of surface active agents,—most of them quite complete in their description of those surface active agents commonly known as "wetting and dispersing agents." However, if we carefully investigate the properties of these so-called "wetting and dispersing agents" and their functions, we will find that with but few exceptions their predominant function is *wetting*, and not *dispersion*.

Dewey and Almy Chemical Company has specialized in the manufacture of those surface active agents which may be classified almost exclusively as dispersing agents, because their action is practically limited to dispersion. This paper will be, therefore, confined to a discussion of these types of dispersing agents.

So that there will be no confusion as to what is meant when referring to dispersing agents, let us first define them:

DEFINITION

Dispersing agents are materials which, when added to a mixture consisting of finely divided matter suspended in a continuous medium in which such matter is not soluble, reduce the cohesive forces between primary mechanical particles of the matter. When mechanical work is done on such a system, flocs or agglomerates are easily broken up and each particle is forced to act as an entity.

In this definition no limitation has been set on the kind of external medium—this may be solid, liquid, or gas as long as it is continuous—nor has any differentiation been made between the different types of medium, such as oil, water, alcohol, etc. However, since the dispersing agents which are to be discussed function only in aqueous medium, this paper will, therefore, be confined to systems where water is the external phase. Also, since there are two recognized types of dispersing agents—anionic and cationic—and since the dispersing agents which are to be discussed are anionic in action, this paper will be further limited to anionic dispersing agents.

Most people confuse wetting agents, suspending agents, emulsifying agents and certain protective colloids with dispersing agents. Therefore, let us define these other agents, realizing, however, that many surface active materials have properties which overlap two or more of the previously mentioned classifications.

Wetting agents lower interfacial tension between solids and water and reduce the angle of contact between water and the material to be wet. Thus, a powder treated with a wetting agent when placed in contact with water would immediately be wet by the water. Wetting agents also lower interfacial tension between water and air. The latter is called surface tension. A simple or elementary wetting agent, dissolved in water, will make a solution which, if shaken in a bottle with air, would easily and quickly form thousands of small bubbles; but when the agitation is stopped, these bubbles would very quickly rise to the surface and immediately break. Many commercial wetting agents, in addition to lowering surface tension, are foam stabilizers; and in such cases, air bubbles will form but will not break and thus cause trouble in entrapping air in compounds made with them.

Suspending agents are materials which, when dissolved in water, hold up or help to hold up finely divided solids in suspension. In most cases, such materials give a gel-like structure when dissolved in water, or increase the viscosity of the water phase; thus slow down settling.

Protective colloids are visualized as agents which actually deposit on solids in suspension to form a protective film or coating around them. Such materials act as a sac or bag around groups of particles (if they are not dispersed) or around individul particles (if they are dispersed) and further prevent agglomeration or floccing, especially that due to the action of electrolytes.

The term *emulsifying agent* embraces a very broad field which is usually associated with agents which not only lower interfacial and surface tension, but which act as protective colloids and have some dispersing and suspending properties.

From the above definitions, it can be seen that "simple" *dispersing agents*—those having dispersing properties only—are definitely not wetting or suspending agents, although they may be emulsifying agents or protective colloids. Not all the dispersing agents which will be referred to in this paper are "simple" dispersing agents. Some of them have definitely overlapping properties.

A proprietary product, which is chemically the sodium salt of alkyl-aryl sulfonic acid of controlled chain length, is a good example of a true or "simple" dispersing agent. A 1 per cent solution of this material in water lowers the surface tension of water only by about two dynes. It has no tendency to promote foam, is not an emulsifying agent and has no protective colloid action. Some of its properties may be illustrated by the following experiment:

*Presented at meeting, Rhode Island Section, January 30, 1942.

CARBON BLACK EXPERIMENT

Make a 25 per cent carbon black paste, that is, carbon black mixed with water so that the resultant paste contains 25 per cent carbon black and 75 per cent water. Note that this paste is very stiff. It cuts like cream cheese and does not flow. To this paste, add a few crystals of the dispersing agent, and stir them in well. Add no water to the paste. A fluid carbon black dispersion will be formed,—one which pours easily from the beaker. To assure complete dispersion, add a few more crystals of the dispersing agent, stir the mixture well again, and then pour some of it into a beaker half filled with water. In a companion beaker also half filled with water, stir in some of the original carbon black paste.

Because of the intensity of color of carbon black, difference in shade between these dilute suspensions may not be easily observed. However, careful examination will show that the suspension made from the carbon black without the dispersing agent is decidedly flocced, and tends to settle quickly to the bottom of the beaker; while in the case of the carbon black treated with dispersing agent, this tendency is definitely nullified.

Filter the two suspensions. Use a reasonably coarse filter paper in order to obtain striking results. Note that in the case of the carbon black suspension containing no dispersing agent, the water which comes through the filter paper is perfectly clear. In the case of the dispersed carbon black, the very fine particles of carbon black come through the filter paper and the filtrate is dark colored. Eventually the pores of the filter paper will become blocked with these fine particles of carbon black, the filtrate will become clear, and the flow of water through the filter will slow down or stop completely.

This experiment shows the use of dispersing agents as agents for increasing the fluidity of pastes. It also demonstrates the dispersing action of inert pigments in a water base.

IRON OXIDE EXPERIMENT

In order to demonstrate the increased color effectiveness which is due to dispersion of pigments, note the difference in shade between iron oxide suspended in water alone, and the same suspension treated with a dispersing agent. When these two suspensions are shaken and allowed to stand for a few seconds, the true color of the iron oxide pigment is the color shown by the dispersed suspension. After standing for a while, it will be noted that the suspension without the dispersing agent shows noticeable settling. The iron oxide has flocced or agglomerated, and these flocs—acting as single particles—have fallen to the bottom of the jar according to Stokes law. The iron oxide in the suspension containing the dispersing agent remains suspended. Thus, in addition to demonstrating the increased color intensity of dispersed pigments, this experiment also shows the tendency for dispersing agents to keep materials suspended.

It is to be pointed out that although the dispersing agent used in this particular experiment is not an absolutely true or "simple" dispersing agent, it is not a suspending agent in itself. The dispersing agent used with the iron oxide is a proprietary product which is chemically the sodium salt of an aryl-alkyl sulfonic acid.

If the dispersed particles of iron oxide were sufficiently small so that they had active Brownian movement, they would remain in suspension for a long period of time. However, like most commercial pigments, many of the particles are so large that they do not have active Brownian movement; and, thus even in a dispersed suspension, they will eventually settle unless a suspending agent is used to prevent this phenomenon.

If these two suspensions were allowed to settle for a long time, say several months, the resultant settled cake in the jar containing the undispersed iron oxide would be much larger than the cake formed from the dispersed suspension. The reason for this is that the large particles in the dispersed suspension settle first, in accordance with Stokes law, and the smaller particles, settling later, fill in the interstices giving, in effect, a close-packed cake which is not as easily shaken back into suspension as one which consists of large flocs or agglomerates resting loosely one on top of the other.

The same sodium salt of an aryl-alkyl sulfonic acid also acts as an emulsifying agent. A 1 per cent solution of it in water lowers the surface tension from about 72 dynes to about 58 dynes/cm^2. This lowering of surface or interfacial tension is not sufficient, however, to allow this material to be used as an emulsifying agent for making oil-in-water emulsions by merely stirring together oil, water, and dispersing agent. In order to make an oil-in-water emulsion, it is necessary to pass the mixture of oil, water and dispersing agent through a homogenizer or colloid mill.

The size of the oil globule suspended in the water phase will be only as small as the mechanical means provided actually breaks down the oil. As a consequence, the setting of homogenizers and colloid mills used for making such emulsions must be as close as possible in order to make the smallest oil globule and, consequently, the best emulsion. Once the oil is broken down into a globule, it will not—in the presence of the required amount of dispersing agent—coalesce to form a continuous oil phase. The emulsion formed will withstand the addition of mild acids, alkalis and electrolytes. It will withstand boiling as well as freezing and thawing without breaking.

Because of the inability of mechanical apparatus alone to make very fine oil globules of colloidal size, if the oil is lighter than the water, the oil-in-water emulsion will cream,—that is, the oil, still in globule shape, will float to the top of a clear water phase. Such a creamed emulsion, when made with this particular dispersing agent, may be shaken or stirred back into the same type of emulsion as originally made; because, in spite of the creaming, there

will be no coalescense of oil globules to form a continuous phase. An example of the stabilizing effect of this dispersing agent, when used in making oil-in-water emulsions, is exemplified in the following experiment:

EMULSION EXPERIMENT

Two 25 per cent kerosene emulsions,—one made with 1 per cent dispersing agent, which is the sodium salt of an aryl-alkyl sulfonic acid; the other made with 15 per cent triethanolamine oleate soap,—look very much alike. The one with triethanolamine oleate is somewhat whiter. Note, however, that when dilute hydrochloric acid is poured into the emulsion made with triethanolamine oleate, there is an immediate "breaking" of the emulsion, with a subsequent formation of a continuous oil phase. When acid is added to the emulsion made with the dispersing agent, no apparent change takes place. This is a very drastic treatment to which very few commercial emulsions would ever be put. Nevertheless, it indicates the unusual stability of emulsions made with this dispersing agent.

If it were not for the time and considerable laboratory apparatus required, the effect of boiling, freezing and thawing of these emulsions could be shown. In such cases, the emulsion made with the dispersing agent would remain stable; while that made with the soap would either break down or become relatively unstable.

These few experiments indicate some of the possible uses of those commercial surface active agents which are relatively true or simple dispersing agents. Some of the commercial products which utilize the property of intensifying color values by the use of dispersing agents are as follows:

Pulp colors
Paper fillers
Paper coatings
Colored water paints
Leather dressings
Colored concrete and mortar
Colored chalk.

Manufacturers of compounded latex products use dispersing agents as grinding aids, as well as for the dispersion of pigments, fillers, anti-oxidants, accelerators, curing agents, etc., to insure even distribution of these finely divided materials in their finished latex compounds. Finely ground sulfur (so-called "colloidal sulfur") is also used by latex compounders. This material is supplied as a 75 per cent sulfur dispersion paste, and is made by ball milling 300-mesh sulfur with a dispersing agent and then adding to the resultant dispersion a suspending agent to overcome any tendency for settling or caking which might take place during the transportation and storage of such a product. If 300-mesh sulfur were ground in a ball mill without a dispersing agent, it might never be ground to the same degree of fineness as the commercial dispersed sulfur which is now used by the latex industry. The formation of agglomerates in a sulfur grind containing no dispersing agent would cushion the balls; and after a while, would almost nullify the grinding effect. However, if conditions were extremely favorable, it might take 200 to 300 hours ball mill grinding to grind sulfur to the same degree as is now accomplished in 60 hours when a dispersing agent is used.

A combination dispersing and suspending agent is used in the manufacture of dry, wettable dispersible sulfur to be used as a fungicidal spray in the agricultural field. A wetting agent, a conditioning agent, and a combination dispersing and suspending agent are blended with 300-mesh sulfur; and the mixture is then ground in a micronizer, so that the average particle size is from 2 to 5 microns. The resultant dry powder wets easily in water, then disperses, and remains in suspension more than long enough for the farmer to use it in his spray apparatus. In commercial practice, the amount of suspending agent used is not enough to keep the sulfur suspended indefinitely. It is primarily used to prevent the formation of a hard cake in the pump or pipe lines of the apparatus. It is obvious, of course, that the wetting agent used must be compatible with the dispersing agent; and in any practical attempt to use a wetting and dispersing agent together, a check should first be made to make sure that the one does not interfere with the other's function.

Dispersing agents are used in large quantities as grinding aids in the final tube mill grinding of portland cement clinker. Although such grinds are dry, the dispersing agent is added as a solution, so that it will be effective under plant operating conditions. The dispersing agents to which I refer are effective only in dry *tube mill* grinding—they do not function to any noticeable extent in batch mills when the grind is dry. They are very effective, however, as grinding aids in wet ball or pebble mill grinds when water is the external phase.

Dispersing agents are used in the preparation of drilling muds used when drilling for oil. These muds not only have to act as lubricants and as seals against premature blow-outs, but must have sufficiently high specific gravity to suspend rock chips so that they will not interfere with the drill bit after they have been once chipped away from the rock formation. It is necessary, therefore, that heavy clays be well dispersed to give these desirable properties.

Dispersing agents are also used in two other prominent industries, involving the use of clays. In the lead pencil industry, control of dispersion of clay and graphite by the use of a dispersing agent of the alkyl-aryl sulfonic acid type has made it possible to make pencil leads much thinner than ever before, and yet sufficiently strong to keep down breakage in processing, shipping, and while in use. The clay casting industry utilizes dispersing agents when casting china ware and pottery from clay slips. In this case, the clay dispersion must be very fluid, but must have as high solids as possible consistent with desired fluidity. Dispersion is very necessary to accomplish this. Many agents commonly used,—such as soda ash, or sodium silicate,—increase the fluidity of clay slips, provided the amount used does not exceed a

maximum specific to each compounded clay body. If an excess is used, the fluidity of the casting slip materially decreases. Such materials, although commonly known as dispersing or deflocculating agents, do not function as dispersing agents, as previously defined. Their action is quite complicated and, although they accomplish a definite purpose under certain conditions, they are not true or simple dispersing agents according to the definition.

Dispersing agents of both the alkyl-aryl sulfonic acid and aryl-alkyl sulfonic acid types act as good dispersing agents for clays. They are, however,—because of their sulfur content—not recommended for commercial use when the pottery or china ware is to be given a glazed coating.

Special dispersing agents have been developed for this particular field. These agents, in addition to being dispersing agents, also have some wetting properties. Such dispersing agents are ammonium salts of long-chain organic compounds, containing no sulfonic acid groups. An excess of these types of dispersing agent may be used without any thickening of the clay slip. The use of ammonia, instead of metallic cations, allows the dispersing agent to be burned out completely when the ware is fired. Also, there is no possibility that any fluxing action will take place, which might be the case if sodium salts were present. For some reason yet unknown, it is reported that clay slips made using these deflocculents produce cast pieces which may be removed from plaster molds much faster than those slips made when using soda ash or sodium silicate.

Dispersing agents are used in the dyestuff industry with certain vat and azo dyes. Water soluble dyes do not require dispersing agents.

The preceding are a few examples of many of the commercial adaptations of dispersing agents. Time and space prohibit the listing and discussion of all industries where dispersing agents are indicated. However, a few more applications warrant mention, because they are somewhat unusual and interesting.

Although true dispersing agents are not detergents, it was decided to find out whether the sodium salt of an aryl-alkyl sulfonic acid could be substituted for soap and other cleaning agents used in commercial laundry work. Preliminary laboratory tests, comparing its action against soap alone, were most promising; and, consequently, intensive tests were conducted for about six months in a large commercial laundry. A mixture of soap, certain other commercial cleaning agents, and the purified form of the dispersing agent mentioned above was found to be more effective in washing clothes than any other known commercial combination. However, this combination offered no economic saving over the materials now used in the United States, but the whole subject is of interest now in countries where fats are at a premium. The function of the dispersing agent in laundering is not to remove the dirt from the clothes. It is to prevent it from redepositing on the fabric. This problem of redeposition is one which is a common phenomenon in laundries, and one which causes a great deal of trouble.

The dispersion of flour for making cakes, breads and pasteries is still of general interest to a large baking and yeast company. About four years ago, preliminary experiments were carried out in this field by a master baker; and at that time, the results did not seem encouraging. Since then, interest has been renewed, and the subject is being investigated further. Who knows but, before long, you may be eating bread, butter and dispersing agent instead of just bread and butter?

Water base inks and three-component oil, water base, pigment inks are fields in which dispersing agents seem to be of real value. One large ink company has patents covering the use of dispersing agents in three-component inks.

Dispersion of titanium dioxide, for delusterizing rayon, materially increases the effectiveness of this opacifying material. Dispersing agents are also used to prevent agglomeration of sulfur at the orifices of the spinnerettes in the production of viscose rayon.

Treatment of ores by the flotation process is a most advanced chemical procedure. In this process, ores are wet ground, classified and then treated in ore flotation cells. Dispersing agents act as grinding aids, as means of increasing the output of classifiers, and also as aids to selective flotation with certain types of ores. Unfortunately, excess quantities of dispersing agents in the flotation cells hinder, rather than aid, the process; and it is necessary to limit the amount used in the whole system to the optimum required in the flotation cells. Since the amount required in the grinding mill and classifier is greater than the maximum allowable in the flotation cell, the effectiveness of the dispersing agent in the mill and classifier is thereby lowered. In the processing of finely ground gold sulfide ores, a maximum of 2/10th of a pound of dispersing agent per ton of ore is sufficient to give the desired increased effectiveness. Two-tenths of a pound of dispersing agent per ton of ore is equivalent to 0.01%.

This brings up the subject as to what percentage dispersing agent is required or recommended for certain uses. This is a very difficult question to answer, inasmuch as 0.01% is adequate in the mining industry, 0.033% for grinding portland cement, 0.15% for dispersing most titanium dioxides, 0.2% for making clay casting slips, 2% for compounding ingredients in latex, 3% for making certain stable emulsions, 4 to 8% for dispersing carbon black, approximately 6% for stabilizing latex itself, and between 10 and 20% for use with certain of the so-called insoluble dyestuffs.

Other unusual applications for dispersing agents are as follows:

1. Dispersing carbon black for making water paste mascara;

2. Preventing formation of flocs in a famous tonic for women;
3. Making charcoal dispersions for keeping cold rolled steel plates from sticking together during processing;
4. Activating certain enzymes;
5. Making graphite dispersions for coating the inside of cathode ray (television) tubes;
6. Dispersing rouges used in grinding of fine lenses;
7. Improving the qualities of deposits from electroplating baths;
8. Increasing the effectiveness of special etching solutions.

In fact, any industry which uses water in combination with finely divided insoluble materials is a possible consumer of dispersing agents.

This paper mentions a few of the common industrial applications and some of the other interesting and unusual adaptations of dispersing agents. It is possible that some of these applications may be used to advantage in your particular industry, and with your particular problems.

Luminescent Pigments—

(Continued from page P185)

had better not be applied all at once in one heavy coating, but in rather several weaker coatings. (Demonstration: fabrics having pigment deposits calculated at ½, 1, 2 and 3 ounces per square yards were shown. The highest concentration glowed by far the best in the dark and even more has been put on by some manufacturers, as much as 4 ounces per square yard. The cost for pigment alone would thus figure about $1.00 per square yard.)

The drying is carried out under the condition dictated by the lacquer and its solvents. The fabric then feels rather rough and would soil very readily. At this point, the cloth may be calendered, but to get a smooth glossy finish, one or two "finishing" coats of clear vehicle are applied, this having the advantage of adding to the protection of the phosphor and increasing the durability of the fabric.

The three prime essentials for getting the best results with this treatment are: (1) the choice of a good phosphorescent pigment; (2) getting the right vehicle; and (3) putting on enough. Any attempt to skimp on this last requirement will produce inferior work, and to try to save on cost by reducing the amount might well defeat the main purpose: to get a strong and long-lasting afterglow.

As for the uses of such fabrics, many may be mentioned and some are rather obvious. In large sheets, they can be used as signs, if black letters or figures are superimposed upon them for the message. Cut into strips they can mark and outline dark stairways, aisles, and handrails. Bands for hats, the arms and legs, and belts, will not only indicate the position of a person in the dark but also his movements. (This was demonstrated.) For the best effect, the wearing of such clothing should go around the person so as to be seen from all sides. A badge or marker in front only would serve no purpose for detection from the rear. All sorts of other markers: for auto fenders, boats, embankments, machinery, places where caution should be observed during black outs, are possible by proper use of luminous paints and pieces of such fabrics.

Radio-active paints have always been too expensive for widespread use. With the experience gained and development made with phosphorescent pigments, many peacetime uses may become possible. A few can be mentioned indicating a trend. House numbers and street signs would become more easily seen by their use. Wall paper could be printed with them. Pull cords when coated would be easier to find in the dark. Bedside lamps with luminous shades would glow brilliantly if the light is turned on only for a minute or two before retiring. Stars and other celestial bodies can be put on ceilings, say in a child's room, this having already been advertised. Dog collars and leashes have been used in England, their visibility in the night being more than a novelty.

DISCUSSION

(After the talk, several questions were asked, some on points already covered by the speaker.)

H. W. Wilkinson asked whether the drying conditions had any effect on the luminescent results? Hot air, cans, infra-red, etc., might be tried. The speaker was of the opinion that the drying concerned only the setting of the lacquer: it should not be too hot or fast, lest bubbles form and pin-holes develop, giving the whole a porous effect rather than smoothness. As for the pigments themselves, heat should not hurt them as they had already been prepared at red heat, far above than which any lacquer could exist.

Arthur E. Hirst recalled reading about some compound of Europium that gave brilliant fluorescent effects in minute quantities. Had the speaker experimented with it? He had not. Mr. Hirst thought that such a compound might make a valuable addition to a discharge printing paste for printing dark-colored backgrounds. When properly lighted, it would be easy to detect scratches and other printing streaks. As far as he knew it had never been tried.

ACKNOWLEDGEMENT

The speaker is grateful to the Rhode Island Laboratories (a subsidiary of the Warwick Chemical Co.) for the use of the phosphors exhibited and to Dr. M. A. Weis for the reading and criticism of the paper.

MEETING, NEW YORK SECTION

THE last regular meeting of the New York Section was held on Friday evening, March 27th, 1942, at the Swiss Chalet, Rochelle Park, N. J. An informal dinner preceded the meeting.

A vote of thanks was extended to Dr. H. W. Stiegler for his efforts as chairman of the program committee and councilor representing this section. Dr. Stiegler has taken active duty as a major in the Chemical Warfare Division of the U. S. Army.

Henry F. Herrmann was elected to represent this section as a judge of the Intersectional Contest to be conducted at the Annual Meeting this Fall. P. J. Wood was elected chairman of the committee to prepare a paper to be presented by this section in the contest.

Dr. Carl Z. Draves, past president, discussed the subject of holding an annual meeting and Intersectional Contest and Kenneth H. Barnard, chairman of the technical program committee for the annual meeting, spoke briefly on his plans. Some members suggested that the contest deal with the war effort and that each section's paper be concerned with some phase of it. As an expression of opinion on the part of the section, votes were taken on (1) whether the association should hold an annual meeting this year and (2) whether the Intersectional Contest should be held. The result of the voting was affirmative in each case.

It was also voted that the social evening and annual outing be held.

Dr. J. E. Meili was elected chairman of the committee on arrangements for the social evening to be held April 24th at the Swiss Chalet and Paul J. Luck was elected chairman of the committee for the annual outing to be held in June.

R. Paul, owner of the Kent Stores, Inc., addressed the section on the subject of "Modern Fabrics: Their Handling and Troubles Encountered in the Dry Cleaning Plant." This subject proved of exceptional interest and considerable discussion followed.

The attendance was about 75.

Respectfully submitted,

NORMAN A. JOHNSON,
Secretary.

MEMBERSHIP APPLICATIONS

Senior

Edward L. Donovan—Chemist, Woonsocket Color & Chemical Co., Woonsocket, R. I. Sponsor: J. H. O'Donnell.

Boris Frankfurt—Textile Chemist, Nova Chemical Corp., New York, N. Y. Sponsors: C. A. Funke, K. H. Barnard.

James W. Simmons, Jr.—Plant Supt., Stodghill & Co., Atlanta, Ga. Sponsors: L. L. Baker, J. E. Smemer.

Eugene J. Steiner—Chemist, Brooklyn, N. Y. Sponsors: W. Gutig, R. C. Geering.

Francis Tripp—Head of Chemistry Dept., New Bedford Textile School, New Bedford, Mass. Sponsors: A. H. Grimshaw, A. C. Hayes.

George M. Vaughan — President, Sterling Textile Co., Atlanta, Ga. Sponsors: L. L. Baker, J. E. Smemer.

Junior

Heinz Rolf Pfund—Chemist, Putnam Finishing Co., Putnam, Conn. Sponsors: E. J. Allard, F. Frey.

Associate

Reuben G. Heinrich—Research Chemist, Surpass Leather Co., Philadelphia, Pa.

Willson J. Rowley—Partner and Salesman, George A. Rowley Co., Philadelphia, Pa. Sponsors: A. E. Jones, Jr., H. B. Dohner.

Student

William E. Bloch — Bradford Durfee Textile School. Sponsor: L. B. Coombs.

Applications for transfer to Senior membership: George W. Fiss, 3rd, Lee Gale Johnston.

Print Room Back Greys—

(Concluded from page P182)

tant a factor in its successful working as the cleansing operation. If the blanket is too absorbent the color cannot be washed out of it; if, on the other hand, it is too heavily waterproofed the color, pressed through the printed material, lies solely on its surface, and is apt, with deeply engraved patterns, to be crushed or spread out beyond its proper limits. The spread-out color is transferred to the back of the printed cloth, and by showing through to the face side produces a clumsy impression. In good condition a wash-blanket ought to be just sufficiently porous to absorb the color it receives, and, at the same time, sufficiently waterproof to prevent that color from penetrating into the actual fibers of its cotton foundation; in other words, it ought to act similarly to an india-rubber sponge so far as taking up color is concerned.

"The great, indeed the only, advantage of wash-blankets is that, in always presenting a clean surface to the back of cloth, they render the use of back greys or 'bumps' unnecessary."

About 1920 Mather and Platt put out a new type of washer where the washing operation was confined to one side; but the blanket was still mackintosh and could only be used on fine patterns. Large solid objects still flushed.

Lately I have seen a blanket washer put out by Dewey & Almy that worked much better. I think they have gone a long way in solving this problem, but still may have some distance to go before they can be used on real heavy blotch work.

Down at Apponaug we have a rather narrow print room, and it occurred to me if we could find some medium that would permit us to use our limited drying capacity now used for drying greys from the printing machine, we could use an endless webb, thus print—wash—dry in a continuous operation. When Zelan came along we found this answered our purpose nicely. As with Zelan treated fabric you get a cleansing action in washing and after nipping only 10/20 per cent expression. This dried readily on the 8 or 9 cans we already have in use for regular back grey drying, so the only installation required is a standard washer and synchronized tension control.

Zelan is now hard to get as all Zelan produced is going into army cloth. When it again becomes available I believe we at Apponaug have something on the ball.

UNEMPLOYMENT REGISTER

Members of this association, who are without employment, should forward to the secretary a statement as to their qualifications and experience. This information will subsequently appear on these pages with an identifying key number. Employers are also requested to file with the American Dyestuff Reporter any vacancies which may occur in their business.—H. C. Chapin, Secretary, Lowell Textile Institute, Lowell, Mass.

NOTICE TO EMPLOYERS

Personal Histories and Employment Records of the following applicants are on file at the office of the American Dyestuff Reporter. Prospective employers may examine them without obligation.

Key: A—Laboratory and research; B—Dyeing or printing; C—Finishing; D—Sales; E—Instruction; F—Executive.

NOTE: PERSONS WHO HAVE OBTAINED EMPLOYMENT SHOULD NOTIFY THE SECRETARY OR THE AMERICAN DYESTUFF REPORTER AT ONCE.

A-1

Education—Graduate textile chemistry and dyeing course, Lowell Textile Institute, 1932. Special course in colloid chemistry at M.I.T.

Experience—Library work in spare time while attending school; five years as assistant chemist with knitting mill, duties consisting of testing and grading silk, testing of oils, soaps, dyes, finishes and other chemicals, making up specifications for various lines of hosiery and checking finished product, keeping a check on production costs, control of waste and irregulars, checking competing products and carrying on research to improve product and reduce costs. Woman; age 30; references.

A-2

Education—B.T.C., Lowell Textile Institute, 1933.

Experience—Textile chemist, cotton and rayon thread; agricultural chemist, protein, fat and mineral analysis; special Federal inspector on textiles, New York City; U. S. inspector, war department; chemist-spotter, dry cleaning experience. Age 32; married.

A-3

Education—B.S. in chemistry, Lehigh University.

Experience—Experimental engineer and analytical chemist, 8 mos.; assistant superintendent of silk corporation, assisted in planning and directing production, in charge of laboratory, technical work, personnel, purchasing, etc., 2 years; inspector of ordnance material, to the present. Seeks position as chemical engineer or chemist.

Age 25; single; references.

A-B-9

Education—Textile School Graduate; Alexander Hamilton Institute Business Course.

Experience—Mature, executive type of textile chemist and colorist with over twenty years' broad general experience in factory, laboratory, purchasing and all around business procedure. Good correspondent. Excellent personality. Wholesome appearance. Fine speaker. Literary and artistic ability. Real color sense. Possesses fund of factual information about material things in a wide range of industries. Capable of meeting the highest type of clientele and planning and directing the efforts of all types of personnel. Desires supervisory, contact, promotional or sales work. Willing to prove ability and versatility.

Age 44; American born; New England Yankee ancestry; married.

A-B-16

Education—3 years analytical textile chemistry and 2 years textile dyeing at Rhode Island School of Design.

Experience—6 years assistant research chemist at cotton finishing plant. Had charge of putting all research into production; complete study of starches, dextrines, gums, resins, finishing oils, softeners and sulfonated oils; considerable microphotography experience: wash and light tests on dyestuffs; knowledge of all cotton finishing operations; experience in water treatment; recent experience as dyer of wool, cotton, rayon (stock and piece goods), and mixtures. Seeks position as chemist, dyer or laboratory technician.

Age 30; American; married; references.

A-B-17

Education—Graduate of Franklin Union and Lowell Textile Institute, 1942.

Experience—1936 until present as assistant dyer in hosiery dye works. Experienced on full fashioned and anklet hosiery, handling wool, cotton, silk, rayon and nylon and combinations; has charge of weighing dyestuffs, testing and shade matching; experience with hosiery dyeing machines of all sizes. Seeks position as assistant dyer or laboratory technician.

Age 24; married; references.

A-B-18

Education—Graduate Philadelphia Textile School, 1940.

Experience—Has experience as assistant chemist and trouble shooter in silk dyeing and finishing plant; as manager of laundry store; and as printer and colorist in screen printing plant. Seeks position in laboratory and research, dyeing, printing or finishing.

Age 21; single; references.

A-B-C-F-1

Education—Textile Institute course in Dyeing and Chemistry; Extension work at Brown University; Executive Training with Alexander Hamilton Institute of New York, N. Y.; working knowledge of one foreign language.

Experience—Dyeing executive on all types of textiles including stock, yarns in the skein, warp and package, and piece goods. Thorough knowledge of all classes of dyes and dyestuffs and their successful practical application in the plant. Extensive knowledge of all types and makes of equipment for dyeing, bleaching, mercerizing and finishing. Laboratory practice in testing, standardizing, purchasing, costing, planning and checking processes, and market analysis. Good manager of personnel for better efficiency in retaining friendly labor relations. Conversant with modern methods for quality production economically secured through better coordination and correct alignment in processing, on cotton, viscose and acetate rayon, silk, wool, worsted, and mixtures. In excellent mental and physical health; excellent references.

A-B-C-F-3

Experience—Broad experience since 1906 as overseer of finishing, general researcher, trouble shooter, overseer of dyeing, general superintendent, mill manager. Experienced in woolen, worsted, cottons, unions and mixtures. Recently specialized in men's wear cottons. Seeks position as overseer of finishing or dyeing, assistant superintendent, superintendent or manager.

Age 53, married; references.

A-C-D-1

Education—Chemistry, Temple College, Philadelphia, evenings. Dyeing and textile chemistry, Philadelphia Textile School.

Experience—Employed about 18 years in textile mill, becoming chemist; 5 years as superintendent of finishing on silk and rayon ribbons; 10 years as salesman of chemicals and textile specialties in eastern Pennsylvania and parts of New Jersey; has some knowledge of the processing of all textiles. Seeks position as salesman with well known company.

Age 48; married.

B-10

Education—2 years chemistry, 2 years textile chemistry and dyeing, Lowell Textile Institute, evenings.

Experience—4½ years dyeing and bleaching hosiery, specializing in children's and infants' hose; 3 years assistant dyer, dyeing and bleaching cotton, mercerized and unmercerized, wool, wool-cotton, wool-rayon and wool-silk hose. Seeks position as second hand, assistant dyer or laboratory assistant in hosiery mill.

Age 27; single; references.

B-D-1

Education—High school graduate; textile chemistry, Textile Evening High School, New York City; accounting; typist.

Experience—from 1935 to present employed as colorist with screen printing plant in New York City. Experienced with all types of fibers and all types of dyes. Shade matching. Versed in accounting, typing, modern office procedure and sales promotion. Able assistant to busy executive. Age 46; single; references.

PIGMENT PADDING PROCESSES

(Continued from page 172)

range of temperatures; (2) freedom from "cracking" during padding and from any tendency to cause aggregation of the minute dye particles; (3) ability to hold the dye particles in perfect suspension for long periods; (4) stability to acids and alkalis; and (5) comparative freedom from frothing during padding.

Calsolene Oil HS satisfies all the above requirements and, in addition, has a slight retarding action on the dyeing properties of vat colors, thus promoting additional levelling during reduction. In the pigment padding of piece goods, 1% Calsolene Oil HS should be used on the volume of the padding bath, i.e., 1 lb. per 10 gal., but in the pigmenting of loose fibers and yarns, much lower concentrations may be used.

DYES

Successful padding can only be achieved by using vat dyes in such a physical state that they form highly dispersed suspensions in the weak padding oil liquor, and must not settle out or form aggregates under wide variations of temperature. Caledon vat dyes, therefore, are specially prepared for this process; they are marketed as Paste Fine, Grains, or Powder Fine.

The Paste Fine brands in various concentrations satisfy demands when the dyes are in regular use and are not left standing in open drums for long periods. Should it be necessary to leave partially filled drums standing, they should be covered with a wet cloth before the lids are put on in order to prevent local drying of the Paste on the sides of the drum as this would tend to form hard lumps which would cause specky pads. Should these conditions arise, suspensions of paste should always be well sieved prior to use in the padding mangle. It is advisable to add the Calsolene Oil HS to the diluted dye when preparing the padding liquor because, under certain conditions, aggregation of the dye may occur if the oil is added to the concentrated dye prior to dilution.

The Caledon Grain types are particularly recommended for the pigment padding process, since they yield extremely fine and stable suspensions when diluted with either hot or cold water, these suspensions being so fine that the dye particles will pass through filter paper. The grains also have the advantage of being non-dusting and, as they are very bulky, are easily and accurately weighed. The Caledon 300 Powder Fine types also yield very satisfactory results, but as they are in a relatively high concentration, greater care should be taken in weighing and completely wetting out prior to dilution.

The preparation of Caledon dyes in Paste, Grain and Powder Fine forms suitable for pigment padding, has received much attention in recent years from the physical point of view, but even yet there arise, from time to time, problems which have not yet been satisfactorily explained, e.g., some dyes are far more amenable to treatment than others, although similarly constituted, and require a good deal more processing to prepare in a "fine" form. Again, in certain cases, it is possible to carry out paddings under identical conditions with similar dyes which differ slightly in physical condition, although both are satisfactory, with the result that, after reduction and dyeing, one padding is weaker than the other, although theoretically there is the same amount of dye present in each case and there is no apparent difference in the resultant degree of penetration. It might be concluded that the difference in particle size of the dyes could cause the difference, but particle size only concerns variation in pigment covering value and penetration and, therefore, there may possibly be some variation caused by slight difference in reduction after padding.

From a manufacturing point of view, Powders Fine and Grains are more difficult to prepare than Pastes Fine, and the higher the concentration the greater the difficulty, so that a special technique has to be adopted in preparing such brands. Furthermore, the preparation of dry brands is becoming of increasing importance, since, in this country, such types are now preferred to pastes for obvious reasons and, moreover, there is no satisfactory method of exporting paste brands, especially to tropical countries, without causing a certain amount of drying.

Summarizing, therefore, it is the present author's experience that the ideal type of vat dye for pigmenting, whether in paste or dry form, should be capable of readily forming a uniform suspension of discrete fine particles, and that the actual form of particles, provided they are sufficiently fine, is of secondary importance, although there are perhaps several exceptions to this rule.

PADDING MANGLE

Various efficient types of padding mangles are available; they give a soft, flexible nip on the cloth by expression between hard and soft rubber rollers. The most popular types are vertical mangles provided with 2 or 3 rollers and giving 1 or 2 immersions, respectively, in the padding liquor, but it is an advantage to give as many immersions in the liquor as possible to ensure thorough penetration of the goods in the minimum of time; with this object in view, various somewhat complicated types of mangles have been introduced by Continental manufacturers. The designs and methods of threading these mangles are shown in Fig. 1.

It is also recommended that the padding trough should be as small as possible (not more than 5 gal. capacity) to

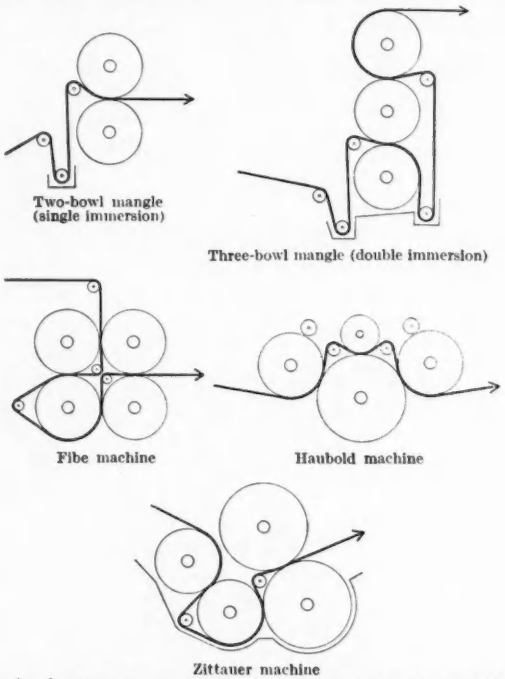


Fig. 1—Arrangement of rollers and methods of threading-up the cloth in various types of padding mangles.

avoid wastage of liquor, and this should be fitted with a closed steam coil or steam jacket and connected to a feed tank fitted preferably with a stirrer and also with a closed steam coil. An expander should be fitted in front of the mangle to prevent creasing of the materials to be padded, and the mangle should be geared to run at speeds of 15-20 yd, per min. and upwards. Experiments should also be carried out on various types of cloth with differing mangle settings in order to determine the degree of expression of the mangle as this is a very important point. This is easily determined by passing a known weight of dry cloth through the mangle containing water and Calsolene Oil HS and determining the weight of liquor absorbed. The padding mangle should be fitted with a batching roller worked by a slip belt or a "plaiting down" arrangement; batching against the rollers by friction with vertical mangle is not recommended. It is also important that all parts of the mangle should be readily accessible and easily cleaned.

PADDING

The actual padding consists simply of passing the dry prepared goods through the liquor at such a speed and temperature that the goods are thoroughly wetted out; with heavy materials of the duck cloth type, it may be advisable to pad several times. The level of the liquor in the trough during padding is maintained by feeding from the stock tank, and at the end of the padding operation the trough should be full. The temperature of the padding liquor may vary from 60° C. to just below b.p., and is determined by the type of goods being padded, heavy goods being padded at high temperatures. Care, however, should be taken to maintain the *same* temperature throughout the padding operation.

It should be borne in mind that, during padding, the pressure of the rollers should be adjusted to give a maximum expression of liquor, as too "sloppy" goods cannot be left for any length of time without further processing, are difficult to dry (if this is found necessary), and rapidly wash "down" during the reduction process.

After padding, the goods are either batched up behind the mangle or plaited down and are then either dried or run on to jigs in the wet state for reducing and dyeing. The goods can be left for several hours before or after drying and before reduction, but must not be left in any part of the dyehouse where drops of water are likely to come in contact with them, otherwise the padded color will be locally washed out.

It is not necessary to dry padding before reduction, but, in general, linen dyers prefer to carry out this process, and in doing so, care must be taken to dry the goods slowly in order to prevent "sizzling" of the color which causes spotted effects, or drying through of the dye which will cause a two-sided effect. It is advisable to lap the first few cans with calico when using drying cylinders and reduce the steam pressure to a minimum. The goods, either wet or dry, are then divided up into suitable lengths for reduction on the jig, end fents stitched on, using flat sewings, and are batched up on the jig in the normal manner, taking care that the paddings are not rubbed or wetted locally in any way. The reduction bath is then prepared, using the quantities of reducing agents normally used for the dyes employed, and reduction and dyeing carried out during 4 to 6 ends at a temperature which is determined by the properties of the dyes being used. It will also usually be found necessary to make further additions of dye to the bath for shading and strengthening purposes; this should be taken from the liquor remaining in the padding bath, which is reduced separately in a bucket and added in 2 separate portions after the first and second ends.

There is always a tendency for dye to wash off from the pieces during the first and second ends, the amount depending on the solubility and amount of dye used for the paddings. Therefore, it is advisable to allow the bath to stand for a few minutes after the first and second ends in order to allow this dye to dissolve, but in the meantime the batch must be kept swinging. Dyeing, shading, oxidation and after-treatment are carried out in the normal manner, the amounts of reducing agents and the temperature depending on the particular dye used.

(To be concluded)

Annual Processing Review Number will appear October 12, 1942

• TRANSFERRED TO NEW YORK

Kenneth H. Barnard, formerly at the print works of the Pacific Mills in Lawrence, Mass., has been transferred to the New York Sales office of the same company at 214 Church Street, as director of their products research laboratory. Mr. Barnard is chairman of the technical program committee for the annual meeting of the American Association of Textile Chemists and Colorists to be held in Atlantic City, N. J., on October 15th, 16th and 17th.

• NYLON DYEING BOOKLET

The Bernard Color & Chemical Corp., 333 Hudson Street, New York City, has recently published a 35 page handbook dealing with the dyeing of nylon piece goods. This report covers several phases of investigation carried on to determine proper classes of colors, methods of application, fastness properties and general dyeing phenomenon. Copies are available upon request.

• GENERAL RELEASE

General Dyestuff Corp., 435 Hudson Street, New York City, has recently issued a circular describing the following products:—

Mothex Extra and Mothex W. Extra (Pat.)—two moth-repelling compounds of the silicofluoride type. It is claimed that, so long as they are not washed, materials treated with either of these compounds will be permanently mothproofed. The compounds are said to be stable, colorless, odorless, non-volatile and non-poisonous. The two products differ primarily in solubility resistance to hard water, fastness to water and foaming. Both products are fast to light and dry cleaning but not to washing. Circular G-311.

• TESTING BOOKLET

The United States Testing Company, Inc., Hoboken, N. J., has published, and is now distributing to its clients, a booklet titled "Testing in Modern Industry." The booklet features conversion tables and specification standards for textiles, chemicals, metals and other materials.

The Testing Company published its first book of tables some forty years ago.

• BATES APPOINTED VICE PRESIDENT

Robert E. McConnell, new President of General Aniline & Film Corporation recently announced the appointment of Joseph S. Bates as Vice President in charge of production for General Aniline division of the company.

Mr. Bates is a graduate of Sheffield Scientific School, Yale University, and has been identified with the chemical industry

News of the Government Agencies.

• BOOKLET ON PRICE CEILINGS

The *Oil, Paint & Drug Reporter*, 59 John St., New York City, has recently issued a booklet entitled "Price Ceilings, Priorities and Allocations." It is a reprint from the March 9th issue of that publication. Its contents include orders of the WPB, OPA and the former OPM having to do with prices, production, distribution and utilization of chemicals, oils and drugs. Copies are available upon request.

• CONSERVATION OF DYESTUFFS

Under Conservation Order M-103, the War Production Board on March 28th set aside, for war purposes only, ten dyestuffs which are necessary for the manufacture of military articles. The ten dyestuffs are: Brown R (C. I. 1151), Brown G (C. I. 1152), Olive R (C. I. 1150), Golden Orange G (C. I. 1096), Golden Orange A (C. I. 1097), Khali 2G, Olive T, Olive GGL, Olive Green B and Yellow 3RD. The restrictions apply to the dyes listed, their equivalents, or mixtures which contain these dyes in excess of 2 per cent.

The order also required that those who had accumulated large stocks of the dyestuffs, which would not be used before April 30th, should, within 5 days, have returned them to the manufacturer.

The order also curtails the use of other anthraquinone vat dyes or other anthraquinone dyes during the period of April 1st to June 30th to an amount not in excess of 12½ per cent of the amount delivered or used during 1941.

During the period April 1st-June 30th, no producer may sell or set aside for export, upon orders other than defense orders, in any calendar month, more dyestuffs requiring anthraquinone derivatives in their manufacture than 8 per cent of the total of such dyestuffs produced in such month by him. Producers of the ten dyes listed above may export in any month an amount of such dyestuff not in excess of 3 per cent of his total monthly production thereof, upon orders accompanied by export licenses issued by the Board of Economic Warfare.

The effect of the order is to divert entirely to war needs certain dyes and to curtail the civilian use of others.

• VIOLATION OF RATIONING

Willful violators of rationing orders and rationing regulations issued by the Office of Price Administration now face direct prosecution and severe penalties under provisions of the Second War Powers Act, 1942, Acting Price Administrator John E. Hamm warned on March 31st.

The Act, which became effective on March 28th when signed by President Roosevelt, provides a maximum penalty of $10,000 fine and imprisonment for one year for willful violation of priority orders of the War Production Board or of rationing orders or regulations of OPA, whether already in effect or issued in the future.

Mr. Hamm disclosed that OPA, working in close cooperation with the Department of Justice, has adopted a comprehensive plan of action for investigation and criminal prosecution of those persons who flout the rationing rules. This plan will be pursued vigorously, he said, with the object of making illicit trafficking in rationed articles an expensive business.

"Until passage of the Second War Powers Act, enforcement of the rationing program has been severely handicapped by the fact that the law provided no criminal penalties for even the most flagrant violations of rationing requirements," Mr. Hamm stated. "Dealers who had made misrepresentations to the government of facts concerning their supplies could be prosecuted for such misrepresentation under existing statutes, but the open and notorious violator could be reached only by suit to enjoin further violations.

"Those who connive to get more than their fair share of any rationed article are equally as guilty as those who traffic illicitly in rationed goods for profit. Public condemnation of these practices now will be supplemented by criminal prosecution."

• 40-CENT WAGE ORDER

Direct wage increases for 150,000 workers in the textile industry will become effective April 20, 1942, under a wage order signed April 6th establishing the minimum wage in this industry at 40 cents per hour beginning on that date.

The order was signed by L. Metcalfe Walling, Administrator of the Wage and Hour Division, U. S. Department of Labor, upon the recommendation of a committee which studied economic conditions in the industry. Total employment in the industry is approximately 750,000, but all except 150,000 already are earning 40 cents or more per hour.

The wage order signed April 6 is the third for the textile industry adopted since the Fair Labor Standards Act became effective October 24, 1938. The first order established a minimum wage of 32½ cents an hour, effective October 24, 1939, while the second increased the minimum to 37½ cents an hour on June 30, 1941.

The industry, as defined in the wage order, includes all textiles except knitted and woolen goods.

for the past 25 years. He served in World War I in the Ordnance Department with rank of Captain. In 1924 he established the Bates Chemical Company, Philadelphia, of which he is President and Treasurer. Mr. Bates has been in the Ordnance Department Reserve for about 17 years, having served recently on active duty from July, 1940 to October, 1941 in connection with the organization and operation of Administration and Export Control with rank of Lieutenant Colonel. Since last October until accepting the present appointment Mr. Bates has been chief of the Coal Tar and Intermediate Section of the Chemical Branch of W.P.B. as a dollar-a-year appointee.

• TO REPEAT TESTING COURSE

Following a precedent set in 1938, the United States Testing Company announces plans for its yearly summer course in Current Textile Analysis and Testing. Although the increasing and vital defense work of the Testing Company encouraged a cancellation of this year's course, the company officials, in answer to increasing requests and in recognition of the timeliness of this type of study, agreed to continue the classes this summer.

Studies will include current textile theories and testing procedures by means of lectures and demonstrations with standard testing equipment. Instructions will cover fiber, fabric, and clothing analysis, manufacture, and testing. The identification, origin and nature of the natural fibers, older and newer synthetics, such as the rayons, casein, vinyon, nylon, fiberglas, and sample swatches for reference will be included. The testing of woven and knit fabrics for such factors as construction, thread count, fiber identification, tensile strength, seam slippage, color fastness to light, washing and drycleaning will be the basis of construction. A study of the new testing equipment recently developed, such as the Warmth Tester, Snag Tester, Torture Machine on Mattresses, and various shrinkage devices, will be an important part of the course. Students will be made acquainted with A.S.T.M., United States Government, Army, Navy, and other standards.

This year's class will be held during the company's regular business hours from 9:00 A. M. to 4:00 P. M. from July 6th, through the 24th, excluding Saturdays and Sundays. There will be a small fee charged this year for the three week period to cover the cost of supplies, mimeographed text and samples necessary for the students' laboratory work. The group of students will be limited in number, in order that they may have the advantage of individual instruction and the opportunity to work with actual testing equipment. Applicants are required to have some elementary and textile training in order that some major portion of the three weeks may be devoted to an intensified study and use of testing apparatus.

Representatives of the fields of education, home economics, industry, and retailing are invited to take the course, applications for which may be obtained from the United States Testing Company's main laboratories in Hoboken, N. J.

• 1942 FALL WOOLEN COLORS

United Victory Colors is the headline for the 1942 Fall Woolen Collection, which The Textile Color Card Association has just issued to its members in confidential advance swatch form. In creating this new collection, which comprises only twenty-two shades, as compared with forty-two to sixty colors in previous seasons, Margaret Hayden Rorke, managing director, stated that the Association had worked over a period of many weeks in close cooperation with the War Production Board and the Association's official Dyestuff Advisory Committee.

The Association has as its objectives, Mrs. Rorke explained, to create only colors that will help in the conservation of dyestuffs and in this way assist the government in its war program. It has avoided stressing any one color family or groups of shades, so as to allow a wider scope in the use of dyestuffs and so prevent concentration on a few colors which would draw too heavily on certain dyes required for war production.

The Association's policy in the above regard is set forth in the following statement accompanying the colors and signed by Mrs. Rorke:

"As a wartime conservation measure and in the interest of National Defense, The Textile Color Card Association has established the policy of reducing the number of colors in all of its collections during the war. Furthermore, the Association will issue only colors which have been passed upon by the Association's Dyestuff Advisory Committee.

"Therefore, all of the colors appearing on the Fall 1942 Woolen Card have been carefully chosen, not only for their fashion significance, but in accordance with the Association's adopted policies.

"Every color in this collection is adaptable to all wool, wool and re-used wool, wool and re-processed wool, woolen and rayon mixtures and woolen and cotton mixtures." The reservation is made, however, that the colors in this collection are not applicable to acetate rayon except when dyestuffs are available.

• ARALAC PRODUCTION

By July or August, it is expected that production of "Aralac" will be increased from 500,000 pounds to around 800,000 pounds per month, according to James Bruce, president of Aralac, Inc. Enlarged production capacity was made necessary due to increasing demands of the textile industry for "Aralac."

"Aralac" will appear in the next few months in sports apparel for men and women, coatings, woolens, men's hosiery, knitted outerwear, blankets, chair cushions, comforters and pillows. Aralac has been used for the past two years in men's and women's fur felt hats.

"Aralac" at this time is a blending fiber only and is not used 100 per cent in any field other than as filling for comforters, chair cushions and the like. It is claimed that its resiliency permits it to be used in this field competitively with wood and with feather and down blends.

Aralac's Taftville plant was originally designed to produce at the rate of 300,000 pounds per month. This production figure was progressively increased to 400,000 pounds after the first six or eight months of operation and two months later was increased to the present rate of 500,000 pounds a month. New machinery and equipment now being installed will permit the company to reach the 800,000 pounds a month figure.

• CLASSIFIED •

POSITION WANTED: Hosiery dyer for past sixteen years on pure silk, cotton, rayon, nylon and mixed fibers, with large hosiery mill in south as head dyer. Capable of handling large production, willing to go anywhere, best reference. Member of American Association of Textile Chemists and Colorists. Write Box No. 355, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

POSITION WANTED: Research chemist, textile dyeing and finishing, experienced in compounding specialties in the textile and allied trades, seeks connection with progressive organization. Write Box No. 371, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

POSITION WANTED: Fireproofing of canvas is the particular field of interest of research chemist, desiring southern location. College education, knowledge of formulation, raw materials, test methods. Has also had training and experience in synthetic resins. Write Box No. 374, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

A CHEMICAL SERVICE EVERY TEXTILE MAN WILL WELCOME

• In "the prepare" of textile goods, or in dyeing and finishing operations, results you can be proud of call for the *right* chemical at the *right* time. This may require developing the correct process on the spot. Or applying existing specialized chemicals, under scientific control, to "shoot" trouble wherever it occurs.

In a nutshell, that is what Sandoz offers you . . . expert chemical analysis *plus* specialized products designed to meet the most exacting requirements of your operating conditions. These products have been developed by working closely with weavers, scourers, dyers and finishers.

Why not take advantage of this service? A trained staff of Sandoz technicians will help you cut operating time and costs in your plant.

SANDOZ

SANDOZ CHEMICAL WORKS, INC., 61-63 Van Dam Street, New York, N. Y.

BOSTON, MASS. • CHARLOTTE, N. C. • PATERSON, N. J. • PHILADELPHIA, PA. • PROVIDENCE, R. I. • CHICAGO, ILL. • LOS ANGELES, CALIF.

"INDEX" To Better Quality Textiles

FOR	Dyeing Flameproofing	USE SOLVAY AMMONIUM CHLORIDE
FOR	Dyeing	USE SOLVAY CAUSTIC POTASH
FOR	Dyeing Hypochlorite bleaching Kier boiling Mercerizing Neutralizing	USE SOLVAY CAUSTIC SODA
FOR	Hypochlorite bleaching Oriental rug finishing Water conditioning	USE SOLVAY LIQUID CHLORINE
FOR	Mothproofing	USE SOLVAY PARA-DICHLOROBENZENE
FOR	Dyeing Softening	USE SOLVAY POTASSIUM CARBONATE
FOR	Acid neutralizing Degumming Fulling Scouring Soap building Softening	USE SOLVAY SNOWFLAKE CRYSTALS
FOR	Acid neutralizing Fulling Hypochlorite bleaching Kier boiling Scouring Soap building Water conditioning	USE SOLVAY SODA ASH
FOR	Dyeing	USE SOLVAY SODIUM NITRITE
FOR	Acid neutralizing Degumming Fulling Scouring Soap building Softening	USE SOLVAY TEXTILE SODA

FOR TECHNICAL SERVICE In the Solvay Laboratories, textile men with years of experience study your problems and make recommendations on the basis of laboratory findings. *Solvay will be glad to send these textile specialists into your plant to study actual operating conditions and help adapt laboratory findings to specific plant conditions.* Write today to

SOLVAY SALES CORPORATION

Alkalies and Chemical Products Manufactured by The Solvay Process Company

40 Rector Street • New York, N. Y.

CHEMISTS BRIDEN COLORISTS

Manufacturers and Distributors of

Dyestuffs and Chemicals Soaps and Oils

•

Our specialties covered by trade marks
Reg. U. S. Pat. Off.

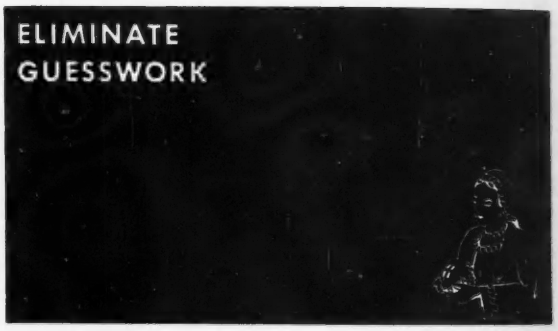
NAPHTACYL **ALPHACYL**
TRITANIUM **ARROCHROME**
PERMACYL **SUPRACLEAN**

—•—

L. L. BRIDEN & COMPANY

Clinton, Massachusetts

Telephone Clinton 105



You will know definitely that your fast dye and shade formulae can always be constant if you rely on

HOOKER

CHEMICALS FOR THE DYESTUFF INDUSTRY

HOOKER standards of uniformity are maintained by continual research and laboratory control. The high quality of HOOKER Muriatic Acid, Caustic Soda, Sodium Sulfide, Sodium Sulfhydrate, Dye Intermediates and Organic Chemicals is guarded under all conditions.

HOOKER technicians are always ready to help solve your problems.

HOOKER ELECTROCHEMICAL COMPANY
NIAGARA FALLS, NEW YORK
NEW YORK CITY · TACOMA, WASHINGTON

2464

Phoenix

AN IMPORTANT NEW DYESTUFF

(Direct and Developed)

BENZAPHEN* DIAZO BORDEAUX M

In accord with the Phoenix policy of producing dyestuffs to fill specific mill requirements, BENZAPHEN DIAZO BORDEAUX M is offered as an outstanding improvement over older dischargeable Bordeaux types. This color is recommended for dyeing cotton or rayon in package form, raw stock, or piece goods.

It is slightly bluer and brighter than the Bordeaux 2BL types. It possesses distinctly superior washfastness, penetrates better, and is equal to the Bordeaux 2BL types in lightfastness and dischargeability.

BENZAPHEN DIAZO BORDEAUX M is readily available for delivery.

Sample & shade card sent on request.

*Reg. U. S. Pat. Off.

Phoenix

COLOR & CHEMICAL CO. · INC. ·

24 VAN HOUTEN STREET · PATERSON, NEW JERSEY

ETERNALURE

Durable Finishes for All Hosiery

A COMPLETE line of superior hosiery finishes developed by the Onyx research laboratories. Today, however, it is not enough, to be superior . . . it is essential that hosiery finishes be Salable, both to the hosiery buyer and the ultimate consumer. Eternalure today is a sales must with hosiery buyers. Backed by an extensive promotional campaign, reaching millions of hosiery sellers and buyers, Eternalure is the preeminent line of finishes for hosiery. Because of the increased feminine appeal and wearability it gives to hosiery, consumers—everywhere, are demanding Eternalure.

Write for Onyx Technicians for Mill Aid
Onyx Sales Promotion Dept. for Sales Aid

ONYX OIL & CHEMICAL COMPANY

JERSEY CITY, N. J.

onyx

Providence, R. I. Chicago, Ill. Charlotte, N. C.

TRIM and SLIM

Trim time from your dyeing and finishing operations and Slim your costs with

BURK-SCHIER

Wet Processing Agents for every textile application

BURKART-SCHIER CHEMICAL CO.

CHATTANOOGA TENN.

RAPIDASE

THE PREFERRED DE-SIZING AGENT

for cottons, rayons and mixed goods

For your de-sizing problems— our technical men are at your service . . . Write or 'phone.

WALLERSTEIN COMPANY, INC.
180 MADISON AVENUE, NEW YORK

FOR SALE

A Bargain for Immediate Delivery

1—Tommy Dodd, 30" Face

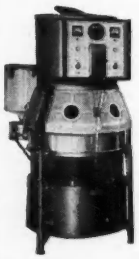
1—5 Roll Universal Calender, 36" Face

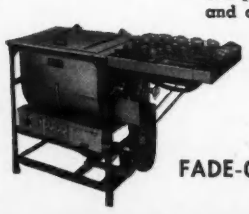
Like New — Operated Less Than 30 Days
Made by Textile Finishing Machinery Co.

For details, write

CALLAWAY MILLS
Purchasing Department
LA GRANGE, GA.

CAN YOU AFFORD TO WASTE A SINGLE HOUR?





● New model FADE-OMETERS and LAUNDER-OMETERS are designed by Atlas to save precious minutes, hours, and days. They provide the fastest known means of accurately determining effects of light and washing on textiles.

Right in your laboratory you can make quick reproducible tests under controlled conditions—get the answer in days that requires months outdoors.

Most Government specifications for textiles mention Atlas-Ometer tests and they're accepted as standard by AATCC, ASTM and other scientific bodies. Atlas Ometers are rated MUST, wherever rigid fading and washing standards must be met. Phone, wire or write for the complete Atlas story today.

Remember there's only ONE

FADE-OMETER ● LAUNDER-OMETER

made exclusively by

ATLAS ELECTRIC DEVICES CO.
371 W. SUPERIOR ST., CHICAGO, ILL.

BIXACID FAST RED GL

FOR

WOOL

This level dyeing wool color is *faster to light* than any other Acid Red. Its good money value renders it of special interest for the production of fast to light Reds, or in combination with Alizarine Blues and Fast Light Yellows for the production of mode shades.

Send for product sample and price

BICK & CO., Inc.

Manufacturing Chemists

Reading, Pa. Charlotte, N. C.

ALIZACHROME BLUE BLACK B

RECOMMENDED FOR USE

IN COMBINATIONS FOR

O. D. FABRICS

ZINSSER & COMPANY, Inc.

ESTABLISHED 1897

Manufacturing Chemists

HASTINGS-ON-HUDSON NEW YORK

The Annual
Processing Review Number

will appear
OCTOBER 12, 1942

•

This was originally scheduled to appear on October 26, 1942.

•

Further details will be announced at a later date.

•

American
Dyestuff Reporter
440 Fourth Ave., New York, N. Y.

CANCER CAN BE CURED!

This is the welcome message your dollar will bring to thousands of cancer sufferers in 1942. Help us carry on the fight.

Enlist in your local field army now.

Buy package labels today.

If you live in the Metropolitan Area, address the New York City Cancer Committee, 130 East 66th Street.

AMERICAN SOCIETY FOR THE CONTROL OF CANCER
New York, New York

The Knit Goods
Processing Number

of the

AMERICAN
DYESTUFF REPORTER

will appear on

APRIL 27, 1942

•

SPECIAL ARTICLES
OF INTEREST
TO ALL KNIT GOODS
WET PROCESSORS
WILL APPEAR

•

NO INCREASE
IN REGULAR
ADVERTISING RATES

•

ADVERTISING COPY
IS DUE IMMEDIATELY

•

AMERICAN
DYESTUFF REPORTER
440 FOURTH AVENUE
NEW YORK, N. Y.

ARE YOU GETTING ALL THAT'S COMING TO YOU?

Check these 10 important advantages of Twitchell Worsted Oil against your present lubricant.

1. **Twitchell Worsted Oil emulsifies directly in hot or cold water.**
2. **It requires no boiling with alkalies.**
3. **May be applied direct or in water emulsion.**
4. **Has excellent spreading properties.**
5. **Won't cause yellowing, rancidity, or heating in stored stocks.**
6. **Won't discolor bleached yarns or pastels.**
7. **Ideal for dry finishing, leaving oil in goods.**
8. **Superior to olive oil, but costs much less.**
9. **Uniformity assured by laboratory control.**
10. **YOU CAN GET IT!**

Experience in many leading plants has proved Twitchell Worsted Oil a superior lubricant for combing, carding, and spinning worsted and high grade wool stocks. Also ideal for blends containing reworked wool, rayon, etc. *Write for details.*

EMERY INDUSTRIES

New England Office
187 Perry Street
Lowell, Massachusetts

Incorporated — **Cincinnati, Ohio**

LABORATORY-CONTROLLED THROUGHOUT PRODUCTION — EMERY INDUSTRIES INC.

New York Office
1336 Woolworth Bldg.
New York, N. Y.

NYANZA

ANILINE & ALIZARINE COLORS

Chemicals and Finishing Materials for All Textile Purposes

Inquiries about Technical Problems Invited

FACTORIES:
CHEMICAL MANUFACTURING CO., ASHLAND, MASS.
NEW BRUNSWICK CHEMICAL CO., NEWARK, N. J.

NYANZA

COLOR & CHEMICAL COMPANY

215 WATER STREET — NEW YORK CITY

549 WEST RANDOLPH ST., CHICAGO, ILL.
115 SOUTHWEST FOURTH AVE., PORTLAND, ORE.

—BRANCHES—

NEW ENGLAND OFFICE: ASHLAND, MASS.
304 EAST MOREHEAD ST., CHARLOTTE, N. CAROLINA

635 DREXEL BUILDING, PHILADELPHIA, PA.
911 NORTH 6th AVE., KNOXVILLE, TENN.

8 STAR PROCESSING PRODUCTS

★ **ARIPEL***
Highly effective anti-fume agent for dyed acetate fabrics, possessing excellent softening and finishing properties.

★ **CULOFIX***
Used as an after treatment to prevent bleeding in water of substantive dyeings on cottons, silks and rayons.

★ **PARAMINE***
Imparts a superbly soft, full, silk-like finish to viscose and acetate fabrics and spun rayons.

★ **TETRANOL***
Rapid and positive penetrant for use in all dyeing operations and with every type of dyestuff to improve penetration of the color and produce a level shade throughout the material being dyed.

★ **LANITOL**
For silk and rayons: a boil-off and scouring agent. For wool: a penetrant for fulling, scourer and soap assistant. For hosiery: a neutral scouring agent used in processing and dyeing hosiery made from mixed fibres or containing a dyed acetate stripe.

★ **AQUAROL***
A water-repellent known throughout the textile industry for its effectiveness on all types of fabrics.

★ **PERMOLITE***
A synthetic resin, reduces slippage of filling yarn in rayons. Produces beautifully soft, full finish on spun rayons.

★ **RESIPON***
Permits positive shrinkage control and produces a soft full hand and a pleasing finish.

* Reg U.S. Pat. Off.

THERE ARE ARKANSAS PRODUCTS FOR

KIER BOILING	SOAKING	SOFTENING	DELUSTERING
SCOURING	BLEACHING	SIZING	WATER-PROOFING
FULLING	PENETRATING	DYEING	STRIPPING
DEGUMMING	FINISHING	LUBRICATING	THROWING

ARKANSAS CO., INC.

MANUFACTURERS OF AC INDUSTRIAL CHEMICALS

NEWARK INC NEW JERSEY

Established for over 35 years

• INDEX • TO ADVERTISERS

Althouse Chemical Co.	
Alrose Chemical Co.	
Amalgamated Chemical Corp.	
American Aniline Products, Inc.	Third Cover
American Cyanamid & Chemical Corp.	Second Cover
American Dyewood Co.	
Aridye Corp.	
Arkansas Company	XXII
Arnold-Hoffman & Co., Inc.	
Atlas Electric Devices Co.	XVIII
Bick & Co., Inc.	XIX
Blickman, Inc., S.	
Burkart-Schier Chemical Co.	XVIII
Butterworth & Sons Co., H. W.	
Briden & Co., L. L.	XVI
Calco Chemical Division, American Cyanamid Co.	XIV
Callaway Mills	XVIII
Campbell & Co., Inc., John	
Carbic Color & Chemical Co.	XII
Carbide & Carbon Chemicals Corp.	
Ciba Company, Inc.	
Colgate-Palmolive-Peet Co.	
Commonwealth Color & Chemical Co.	
Du Pont de Nemours & Co., E. I.	
Dyestuffs Division	Front Cover
Fine Chemicals Division	
R. & H. Chemicals Dept.	
Emery Industries, Inc.	XXI
Exact Weight Scale Co.	
Fancourt & Co., W. F.	
Franklin Process Co.	
Gardinol Corp.	VI
Geigy Company, Inc.	
General Dyestuff Corp.	V
General Chemical Co.	
Hart Products Corp.	
Hercules Powder Co., Naval Stores Dept.	VIII
Hotel Manger	
Hooker Electrochemical Co.	XVI
Houghton & Co., E. F.	
Kali Manufacturing Co.	
Kelco Co.	
Laurel Soap Mfg. Co.	
Mathieson Alkali Works, Inc.	
National Aniline Division, Allied Chemical & Dye Corp.	IX
National Oil Products Co.	XXIII
National Carbon Co., Inc., Carbon Sales Division	III
Nyanza Color & Chemical Co.	XXI
Onyx Oil & Chemical Co.	XVII
Perkins & Son, Inc., B. F.	X
Philadelphia Quartz Co.	
Phoenix Color & Chemical Co.	XVII
Prince George Hotel	
Procter & Gamble	
Riggs & Lombard, Inc.	
Rodney Hunt Machine Co.	
Rohm & Haas Co.	XXIV
Royce Chemical Co.	Back Cover
Sandoz Chemical Works	XV
Scholler Bros., Inc.	
Skinner & Co., Ltd., Thomas	
Socony-Vacuum Oil Co., Inc.	XI
Solvay Sales Corp.	XVI
Stein, Hall & Co., Inc.	IV
Union Carbide & Carbon Corp.	III
Van Vlaanderen Machine Co.	
Virginia Smelting Co.	
Wallerstein Co., Inc.	XVIII
Warner Chemical Co.	VII
Watson-Park Co.	
Wolf & Co., Jacques	
Young Aniline Works	
Zinsser & Co.	XIX

Announcing NOPCO 1212 in rayon throwing for full-fashioned hosiery

Nopco 1212 is a softener and lubricant developed by Nopco Research Laboratories for use with gelatine or casein for sizing of high twist yarn for full-fashioned knitting. It is made from domestic fats, assuring constant supply. Nopco 1212 will prove as indispensible to the throwster of rayon for full-fashioned hosiery as Nopco 1211 is in throwing rayon yarn for weaving.

Throwsters using Nopco 1212 find the following important advantages for the product:

1. No special equipment necessary. Easily applied.
2. Greater flexibility in sizing of the yarn — permits throwster to adjust solution to cover all knitting conditions.
3. Water soluble soakings.
4. Economical to use. Costs throwster a few cents a pound for soaking materials.
5. Good-running yarns both for throwing and knitting resulting in less press-offs for the knitter.
6. With aid of gelatine or casein, sizing permits processing of yarn having up to 40 turns one-way twist.

WRITE TODAY FOR YOUR COMMON SENSE BULLETIN!

A special Bulletin, which will be of interest to both the throwster and knitter of rayon for full-fashioned hosiery, has been prepared by Nopco. A copy is yours for the asking.

NOPCO

REG. U.S. PAT. OFF.

"EVOLVED THRU RESEARCH"

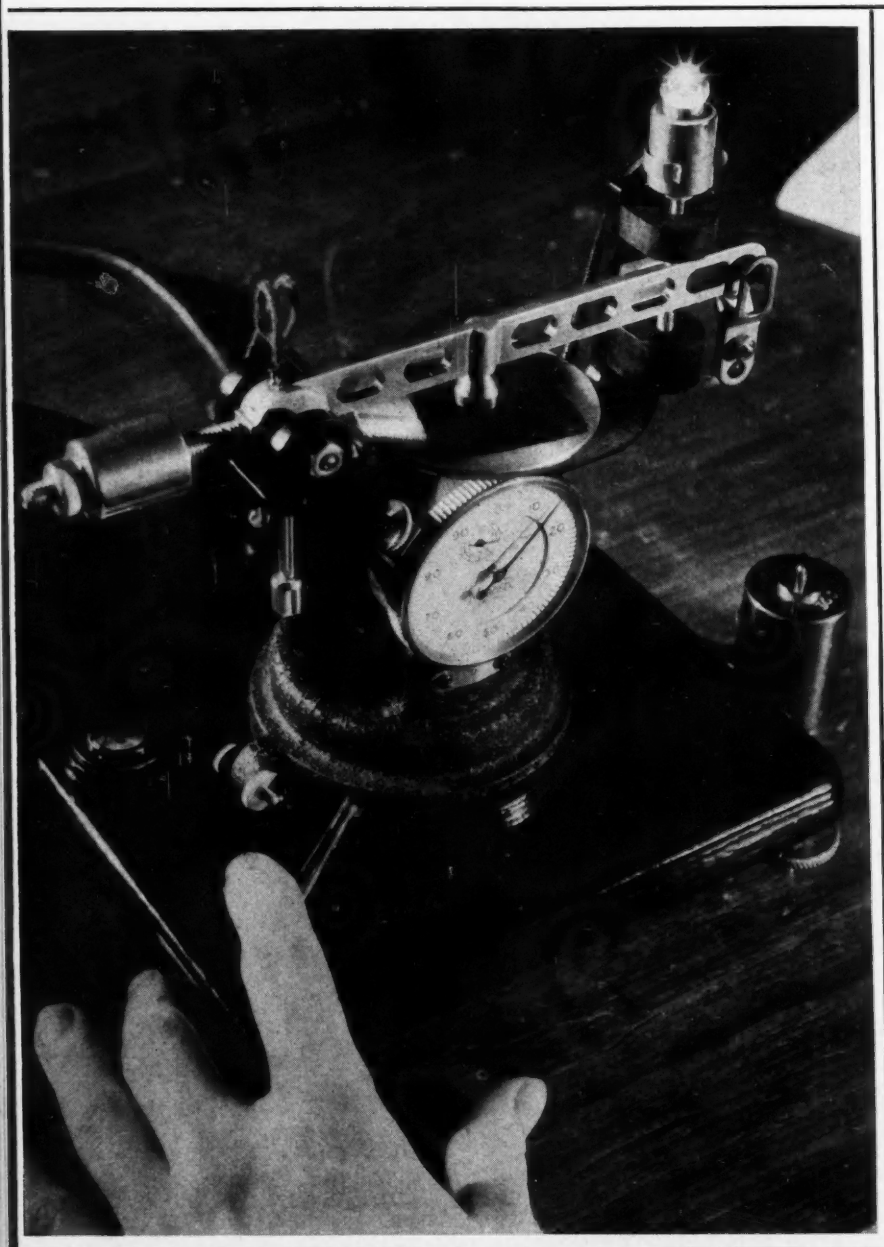
National Oil Products Co.

HARRISON, NEW JERSEY

Boston • Chicago • Los Angeles

Cedartown, Georgia

Why use a compressometer?



THE COMPRESSOMETER is the only instrument that satisfactorily measures the resistance and resilience of pile fabrics to crushing. This same instrument also provides dependable data on the crush resistance of velvets.

Compressometers vary in construction, but they all operate on one general principle. The fabric to be evaluated is placed upon a platform; the platform is raised very slowly until contact is made with a delicately balanced beam. The slightest contact with this beam destroys the equilibrium of the balance and causes the light to flash on. In this way an extremely precise measurement of the thickness of the cloth may be obtained.

Then the cloth is subjected to a specific pressure for a given time, allowed five minutes to recover, and the thickness is measured again. An exact evaluation of the cloth's ability to resist crushing can thus be made.

WE TEST EVERY PROPERTY

Successful translation of research into mill procedure requires an exact knowledge of all of the factors involved. Each particular property of the fabric, whether it be resiliency or tensile strength, shrinkage resistance or wet strength, must be evaluated and determined separately by especially-designed instruments with trained observers to interpret correctly the values noted.

In the Rohm & Haas Laboratories, men and machines are in balance. Our technical men know textile processing methods as well as laboratory procedure. At their side stands specialized equipment for conducting most every conceivable yarn and fabric tests. We invite you to allow this ideal combination of men and machines to assist you with your problems.

- ★ LYKOPON
- ★ FORMOPON
- ★ PROTOLIN
- ★ RHONITES
- ★ RHOPLEXES
- ★ DEGOMMAS
- ★ TRITONS
- ★ RHOTEXES

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA, PA.

Manufacturers of Leather and Textile Specialties and Finishes . . Enzymes . . Crystal-Clear Acrylic Plastics . . Synthetic Insecticides . . Fungicides . . and other Industrial Chemicals

FASTOGENE

AMERICAN ANILINE PRODUCT

STOPS BLEEDING OF DIRECT COLORS

THRILLING RESULTS

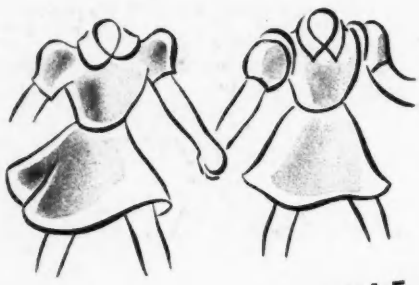
ON RAYON AND COTTON

GENERALLY APPLIED

EITHER IN PRINTING OR DYEING

NOT SURPASSED

EVER AVAILABLE



TWO LITTLE GARMENTS WENT TO MARKET

—BUT THIS LITTLE GARMENT WENT TO TOWN

VELV-O RAY

—THE BLENDED FINISHING OIL

No wonder the little red garment went to town! The fabric from which it was made was finished with Velv-O-Ray — the blended finishing oil. Velv-O-Ray gives fabrics a soft, silky texture . . . protects them against ageing defects. It eliminates rancidity . . . stickiness . . . objectionable odor.

Velv-O-Ray will help you give your fabrics *extra* sales appeal. This famous blended oil will improve their finish . . . give them the body, drape and fine texture that distinguish quality goods. Velv-O-Ray softens all types of synthetic fabrics. Uniform penetrating power makes it ideal for cotton, silk and mixtures. When properly applied to quetsch or mangle, it will not foam.

VELV-O-RAY LOWERS COSTS. Manufactured under constant laboratory control, Velv-O-Ray is known for dependability and economy. Its high uniformity and pure non-mineral content assure you of lower finishing costs. *And remember*: Velv-O-Ray has no deteriorating effects on the blankets of Palmer and Sanforizing machines. Our technical staff is ready to help you with your finishing problems. Write today for facts on VELV-O-RAY FREE CONSULTATION.

ROYCE CHEMICAL COMPANY

CARLTON HILL, NEW JERSEY

MANUFACTURERS OF SULPHONATED OILS INCLUDING VELV-O-RAY*, CASTROLITE*, AND HYDROSULPHITES INCLUDING PAROLITE*, VATROLITE*, DISCOLITE*

*Reg. U. S. Pat. Off.